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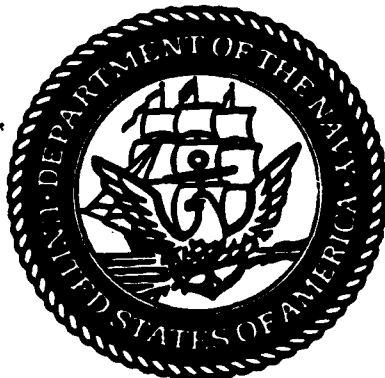


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DEPARTMENT OF THE NAVY

AMENDED FY 1992/FY 1993 BIENNIAL BUDGET ESTIMATES



DTIC
ELECTE
JUN 30 1992
S A D

R, D, T, & E DESCRIPTIVE SUMMARIES (U)
SUBMITTED TO CONGRESS JANUARY 1992.

RESEARCH, DEVELOPMENT, TEST &
EVALUATION, NAVY

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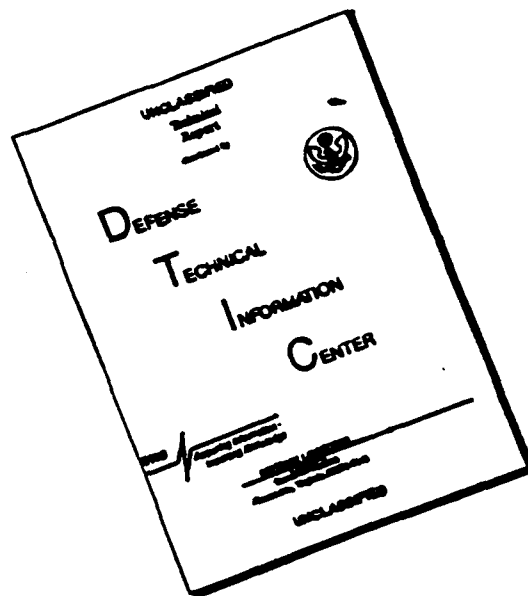
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**NAVY RDT&E
PROGRAM ELEMENT DESCRIPTIVE SUMMARIES**

INTRODUCTION AND EXPLANATION OF CONTENTS

1. General. This document has been prepared to provide information on the Department of the Navy Research, Development, Test and Evaluation Program to Congressional committees during the FY 1993 hearings. The Descriptive Summaries provide narrative information on all non-special access Navy RDT&E Program Elements and Projects.
2. Comparison of Fiscal Data. A direct comparison of data in the Program Element Descriptive Summaries dated February 1991 will reveal significant differences. Many of the differences are attributable to the following factors:
 - a. FY 1992 reductions and increases as a result of Congressional action on the appropriation.
 - b. FY 1992 reductions due to proposed rescissions.
 - c. FY 1991 funding changes including Navy RDT&E Reprogramming Actions and rescissions approved by Congress.
 - d. Reclassification of FY 1991 and FY 1992 data to achieve comparability with the program structure for FY 1992/FY 1993.
3. Relationship of FY 1993 Budget to the FY 1992 Budget Approved by Congress. The following is a list of all program elements which do not appear on the Base for Reprogramming Action (DD 1414) for Navy RDT&E which was prepared pursuant to final Congressional action on the FY 1992 DoD Budget Submission to Congress.

PGM ELEMENT TITLE

0205633N	AIRCRAFT EQUIP RELIAB/MAINT PGM	FUNDED IN FY91
0603238N	AIR DEF/PREC STRIKE TECH DEMO	NEW START IN FY93
0603555N	UNDERSEA SUPERIORITY TECH DEMO	NEW START IN FY93
0604217N	S-3 WEAPON SYSTEM IMPROVEMENT	FUNDED IN 0603790D IN FY92
0604233N	ATA/AX	FUNDED IN FY91
0604618N	JOINT DIRECT ATTACK MUNITION	FUNDED IN 0604609N IN FY92
0604721N	BATTLE GRP PASS HORIZON EXT SYS	FUNDED IN 0604231N IN FY92

4. Classification. Classified information is identified by use of brackets as [].
5. Table of Contents. The Table of Contents is presented in two different formats - Alphabetically and in R-1 Line Item Order.

Accession For	
NTIS CRA&I	<input checked="checked" type="checkbox"/>
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Unannounced	<input type="checkbox"/>
Justification	
By <i>per ltr.</i>	
Distribution/	
Availability Codes	
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6. Highly Classified Programs. The following program elements are funded in FY 1993, however, due to classification are not provided in this document:

<u>PROGRAM ELEMENT</u>	<u>TITLE</u>
0301327N	TECH RECONN & SURV
0304111N	SPECIAL ACTIVITIES
0603270N (PROJ R2141 ONLY)	ADVANCED RADAR TECHNOLOGY
0603525N	PILOT FISH
0603536N	RETRACT JUNIPER
0603576N	CHALK EAGLE
0603591N	JOINT ADV SYSTEM
0603734N	CHALK CORAL
0603735N	WWMCCS ARCHITECTURE SUPPORT
0603737N	LINK HAZEL
0603746N	RETRACT MAPLE
0603748N	LINK PLUMERIA
0603750N	CHALK WEED
0603751N	RETRACT MAPLE
0603752N	CHALK POINSETTIA
0603755N (PROJ Z2136 ONLY)	LINK IRON
0603787N	SPECIAL PROCESSES

7. Navy RDT&E In-House Activities. Preparation of this exhibit was begun before the Naval Laboratory Consolidation was effective on 14 January 1992. The names used in this document, therefore, are a combination of new and old names for the various In-House activities. Following is a cross-walk for the new organizations under: Naval Air Warfare Center; Naval Command, Control and Ocean Surveillance Center; Naval Surface Warfare Center; Naval Undersea Warfare Center; and the Naval Research Laboratory.

NAVAL AIR WARFARE CENTER (under NAVAL AIR SYSTEMS COMMAND)

<u>OLD</u>	<u>NEW</u>
Naval Air Test Center Patuxent River, MD NATC PATUXENT RIVER MD	Naval Air Warfare Center Aircraft Division Patuxent River, MD NAVAIRWARCENACDIV PATUXENT RIVER MD
Naval Air Development Center Warminster, PA NADC WARMINSTER PA	Naval Air Warfare Center Aircraft Division Warminster Warminster, PA NAVAIRWARCENACDIV WARMINSTER PA
Naval Avionics Center Indianapolis, IN NAC INDIANAPOLIS IN	Naval Air Warfare Center Aircraft Division Indianapolis Indianapolis, IN NAVAIRWARCENACDIV INDIANAPOLIS IN
Naval Air Engineering Center Lakehurst, NJ NAEC LAKEHURST NJ	Naval Air Warfare Center Aircraft Division Lakehurst Lakehurst, NJ NAVAIRWARCENACDIV LAKEHURST NJ
Naval Air Propulsion Center Trenton, NJ NAPC TRENTON NJ	Naval Air Warfare Center Aircraft Division Trenton Trenton, NJ NAVAIRWARCENACDIV TRENTON NJ

NAVAL AIR WARFARE CENTER (under NAVAL AIR SYSTEMS COMMAND) continued

OLD
Pacific Missile Test Center
Point Mugu, CA
PMTC PT MUGU CA

Naval Air Station
Point Mugu, CA
NAS PT MUGU CA

Naval Weapons Center
China Lake, CA
NWC CHINA LAKE CA

None

NEW
Naval Air Warfare Center Weapons Division
Point Mugu, CA
NAVAIRWARCENWPNDIV PT MUGU CA

Naval Air Weapons Station
Point Mugu, CA
NAVAIRWPNSTA PT MUGU CA

Naval Air Weapons Center Weapons Division
China Lake, CA
NAVAIRWARCENWPNDIV CHINA LAKE CA

Naval Air Weapons Station
China Lake, CA
NAVAIRWPNSTA CHINA LAKE CA

NAVAL COMMAND, CONTROL AND OCEAN SURVEILLANCE CENTER (under SPAWAR)

OLD
None

Naval Electronic Systems
Engineering Center, San Diego
San Diego, CA
NESEC SAN DIEGO CA

Naval Electronic Systems
Engineering Center, Vallejo
Vallejo, CA
NESEC VALLEJO CA

Naval Electronic Engineering
Activity, Pacific
Pearl Harbor, HI
NEEACT PAC PEARL HARBOR

Naval Ocean Systems Center
San Diego, CA
NOSC SAN DIEGO CA

Naval Ocean Systems Center
Detachment
Kailua, HI
NOSC DET KAILUA HI

Formerly part of NADC,
Warminster, PA

NEW
Naval Command Control and Ocean Surveillance
Center West Coast
ISE Division
San Diego, CA
NCCOSC WC ISE DIV SAN DIEGO CA

No change in name. Under NCCOSC WC ISE DIV.

No change in name. Under NCCOSC WC ISE DIV.

No change in name. Under NCCOSC WC ISE DIV.

Naval Command Control and Ocean Surveillance
Center
RDT&E Division
San Diego, CA
NCCOSC RDTE DIV SAN DIEGO CA

Naval Command Control and Ocean Surveillance
Center RDT&E Division Detachment
Kailua, HI
NCCOSC RDTE DIV DET KAILUA HI

Naval Command Control and Ocean Surveillance
Center RDT&E Division Detachment
Warminster, PA
NCCOSC RDTE DIV DET WARMINSTER PA

NAVAL COMMAND, CONTROL AND OCEAN SURVEILLANCE CENTER (under SPAWAR) continued

OLD

Navy Space Systems Activity
Los Angeles, CA
NSSA LOS ANGELES CA

Fleet Combat Direction Systems Support Activity
San Diego, CA
FCDSSA SAN DIEGO CA

NEW

No change in name. Under NCCOSC RDTE DIV.

No change in name. Under NCCOSC RDTE DIV.

NAVAL SURFACE WARFARE CENTER (under NAVAL SEA SYSTEMS COMMAND)

OLD

NEW

Naval Surface Warfare Center
Dahlgren, VA
NSWC DAHLGREN VA

Dahlgren Division
Naval Surface Warfare Center
Dahlgren, VA
NAVSURFWARCENDIV DAHLGREN VA

Naval Surface Warfare Center
Detachment
Fort Lauderdale, FL
NSWC DET FT LAUDERDALE FL

Naval Surface Warfare Center Dahlgren
Division Detachment Fort Lauderdale
Fort Lauderdale, FL
NAVSURFWARCEN DET FT LAUDERDALE FL

Naval Surface Warfare Center
Detachment
White Oak Laboratory
Silver Spring, MD
NSWC DET SILVER SPRING MD

Naval Surface Warfare Center Dahlgren
Division Detachment White Oak
Silver Spring, MD
NAVSURFWARCEN WHITE OAK DET SILVER
SPRING MD

Naval Coastal Systems Center
Panama City, FL
NCSC PANAMA CITY FL

Coastal Systems Station Dahlgren
Division
Naval Surface Warfare Center
Panama City, FL
NAVSURFWARCENCOASTSYSTA PANAMA CITY FL

David Taylor Research Center
Bethesda, MD
DTRC BETHESDA MD

Carderock Division
Naval Surface Warfare Center
Bethesda, MD
NAVSURFWARCEN CARDEROCKDIV BETHESDA MD

Annapolis Laboratory
David Taylor Research Center
Detachment
Annapolis, MD
DTRC DET ANNAPOLIS MD

Naval Surface Warfare Center Carderock
Division Detachment
Annapolis, MD
NAVSURFWARCEN DET ANNAPOLIS MD

Naval Ship Systems Engineering
Station
Naval Base
Philadelphia, PA
NSSES PHILADELPHIA PA

Naval Ship Systems Engineering Station
Carderock Division
Naval Surface Warfare Center
Naval Base
Philadelphia, PA
NAVSURFWARCEN SHIPSYSENGSTA PHILADELPHIA PA

Naval Ship Weapon Systems
Engineering Station
Port Hueneme, CA
NSWSES PORT HUENEME CA

Port Hueneme Division
Naval Surface Warfare Center
Port Hueneme, CA
NAVSURFWARCENDIV PORT HUENEME CA

NAVAL SURFACE WARFARE CENTER (under NAVAL SEA SYSTEMS COMMAND) continued

<u>OLD</u>	<u>NEW</u>
Integrated Combat Systems Test Facility San Diego, CA ICSTF SAN DIEGO CA	Integrated Combat Systems Test Facility Port Hueneme Division Naval Surface Warfare Center San Diego, CA NAVSURFWARCEN INTCOMBATSYSTESTFAC SAN DIEGO CA
Fleet Combat Direction Systems Support Activity, Dam Neck Virginia Beach, VA FCDSSA DAM NECK VA	Fleet Combat Direction Systems Support Activity, Dam Neck Port Hueneme Division Naval Surface Warfare Center Virginia Beach, VA NAVSURFWARCEN FLTCOMBATDIRSSACT DAM NECK VA
Naval Mine Warfare Engineering Activity Yorktown, VA NAVMINWARENGACT YORKTOWN VA	Naval Mine Warfare Engineering Activity Port Hueneme Division Naval Surface Warfare Center Yorktown, VA NAVSURFWARCEN MINEWARENGACT YORKTOWN VA
Naval Weapons Support Center Crane, IN NWSC CRANE IN	Crane Division Naval Surface Warfare Center Crane, IN NAVSURFWARCENDIV CRANE IN
Naval Ordnance Station Louisville, Kentucky NOS LOUISVILLE KY	Naval Ordnance Station Crane Division Naval Surface Warfare Center Louisville, Kentucky NAVSURFWARCEN ORNSTA LOUISVILLE KY
Naval Ordnance Station Indian Head, MD NOS INDIAN HEAD MD	Indian Head Division Naval Surface Warfare Center Indian Head, MD NAVSURFWARCENDIV INDIAN HEAD MD

NAVAL UNDERSEA WARFARE CENTER (under NAVAL SEA SYSTEMS COMMAND)

<u>OLD</u>	<u>NEW</u>
Naval Undersea Warfare Engineering Station Keyport, WA NUWES KEYPORT WA	Naval Undersea Warfare Center Division Keyport, WA NAVUNSEAWARCENDIV KEYPORT WA
Naval Underwater Systems Center Newport, RI NUSC NEWPORT RI	Naval Undersea Warfare Center Division Newport, RI NAVUNSEAWARCENDIV NEWPORT RI
New London Laboratory Naval Underwater Systems Center Detachment New London, CT NUSC NEW LONDON CT	Naval Undersea Warfare Center Detachment New London, CT NAVUNSEAWARCEN DET NEW LONDON CT

NAVAL UNDERSEA WARFARE CENTER (under NAVAL SEA SYSTEMS COMMAND) continued

OLD

Naval Underwater Systems
Center Detachment
West Palm Beach, FL
NUSC DET AUTEC WEST PALM
BEACH FL

Naval Underwater Systems
Center Detachment AUTEC
Andros Island, Bahamas
FPO Miami, FL
NUSC DET AUTEC ANDROS
ISLAND BAHAMAS

NEW

Naval Undersea Warfare Center Detachment
AUTEC
West Palm Beach, FL
NAVUNSEAWARCEN DET WEST PALM BEACH FL

Naval Undersea Warfare Center Detachment
AUTEC
Andros Island, Bahamas
FPO Miami, FL
NAVUNSEAWARCEN DET AUTEC ANDROS ISLAND
BAHAMAS

NAVAL RESEARCH LABORATORY (under OCNRL)

OLD

Naval Research Laboratory
Washington, DC
NRL WASHINGTON DC

Naval Oceanographic and
Atmospheric Research Lab
Stennis Space Ctr., MS
NOARL SSC MS

NEW

No Change

Naval Research Laboratory Stennis Space Ctr
Stennis Space Center, MS
NRL SSC

SECTION I

RDT&E,N DESCRIPTIVE SUMMARIES

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0603529N	ADVANCED ANTI-SUBMARINE WARFARE TARGET	71	329
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0603785N	ASW ENVIRONMENTAL ACOUSTIC SUPPORT (AEAS)	114	497
0205620N	ASW COMBAT SYSTEMS INTEGRATION (ASWCSI)	200	93
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0604214N	AV-8B AIRCRAFT (ENGINEERING)	121	529
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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101221N BUDGET ACTIVITY: 3
 PROGRAM ELEMENT TITLE: Fleet Ballistic Missile (FBM) System
 PROJECT NUMBER: J0091 PROJECT TITLE: FBM System

A. (U) RESOURCES: (Dollars in Thousands)						
PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
J0091	SLBM System Improvement Program	23,028	7,746	5,135	CONT.	CONT.

B. (U) DESCRIPTION: This effort currently supports integration of the NAVSTAR Global Positioning System (GPS) capability into the TRIDENT I (C4) weapon system, support of the Navigation Test Ship and investigation of potential opportunities for technology insertion to solve obsolescence problems in the ship installed TRIDENT I (C4) Fleet Ballistic Missile Weapon System.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Continued integration studies and analysis of the ability of the GPS to functionally replace TRANSIT in the TRIDENT I (C4) navigation subsystem. Supported the Navigation Test Ship's test program. This effort included test generation, data gathering and data evaluation. The Vulnerability and Effectiveness (V&E) program supported various studies and evaluations of issues that had potential to impact the FBM system.

2. (U) FY 1992 PROGRAM: Integrate NAVSTAR GPS receiver equipment into the TRIDENT I navigation subsystem and conduct investigations into potential additional uses of GPS in the navigation subsystem. Continue support of the Navigation Test Ship's test program. The efforts conducted under the V&E program have been terminated due to Congressional action. Efforts have been initiated to understand the impact on the TRIDENT I (C4) ship installed weapon system caused by the delay in providing the TRIDENT II capability to Pacific TRIDENT SSBNs (D5 Backfit). This effort will also conduct limited exploration into changing requirements on FBM systems. It will support assessment of potential responses to the rapidly changing world environment as reflected in modified targeting requirements on FBM systems.

3. (U) FY 1993 PLANS: Enter engineering development to integrate the NAVSTAR GPS receiver equipment into the navigation subsystem. Continue support of the Navigation Test Ship's test program. Continue efforts on understanding long-term effects to the TRIDENT I (C4) ship installed weapon system caused by the delay in providing the TRIDENT II capability to Pacific TRIDENT SSBNs (D5 Backfit). Conduct limited exploration into changing requirements on FBM systems. Support assessment of potential responses to the rapidly changing world environment such as modified targeting requirements on FBM systems.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Strategic Systems Programs, Wash., D.C.
 CONTRACTORS: Charles Stark Draper Lab., Cambridge, MA; Kaman Sciences Corp., Colorado Springs, CO; Lockheed Missiles and Space Co., Sunnyvale, CA; Rockwell International Corp., Anaheim, CA; PARAMAX Systems Corp, Great Neck, NY.

E. (U) RELATED ACTIVITIES: PE 0604363N, TRIDENT II - Development of the TRIDENT II (D5) Strategic Weapon System; PE 0604777N, NAVSTAR GPS - Development of the NAVSTAR Global Positioning System.

F. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)						
		FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT						
OPN 1/#186,245		52,500	72,900	47,800	CONT.	CONT.
WPN 2/#64		4,900	3,100	4,000	CONT.	CONT.

1/ These funds provide for the procurement of test instrumentation; equipment for maintenance, calibration, handling, data processing and tests at shore facilities; alterations to tactical hardware; new tactical hardware; and initial and replenishment spares and repair parts.

2/ These funds support spares and repair parts.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101224N BUDGET ACTIVITY: 3
 PROGRAM ELEMENT TITLE: SSBN Security Technology Program
 PROJECT NUMBER: R0092 PROJECT TITLE: SSBN Security Technology

A. (U) RESOURCES: (Dollars in thousands)

PROJECT		FY 1991	FY 1992	FY 1993	TO	TOTAL
NUMBER	TITLE	ACTUAL	ESTIMATE	ESTIMATE	COMPLETE	PROGRAM
R0092	SSBN					
	Security	45,119	54,429	72,553	CONT.	CONT.

B. (U) DESCRIPTION: The purpose of the SSBN Security Program is to ensure the current covert mobility and pre-launch survivability of the Fleet Ballistic Missile Submarine Force with respect to emerging applications of advanced technology in the ocean environment. This program identifies requirements for maintaining or enhancing the current tactical superiority and stealth characteristics of the Fleet Ballistic Missile Submarine Force.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:
 - a. (U) Continued tactical development and operations analysis, including methods to assist in/
 - b. (U) Continued programs in
 - c. (U) Demonstrated real time, long range, detection capability.
 - d. (U) Conducted an at-sea evaluation of potential submarine vulnerability to detection.
 - e. (U) Conducted a major sea test to evaluate sensor concepts in low noise environments.
 - f. (U) Collected ambient data in experiments for analysis of techniques.
 - g. (U) Initiated clutter reduction techniques.
 - h. (U) Conducted Electromagnetics Symposium to identify technical issues.
 - i. (U) Conducted two field tests that resulted in detections to and counterdetections to
 - j. (U) Installed sensors at Dabob Bay; 9 submarines signatures measured.
 - k. (U) Initiated development of 3-D late wake horizontal eddy model.
 - l. (U) Initiated capability.
 - m. (U) Conducted test to evaluate effectiveness of countermeasure paints.
 - n. (U) Validated model for modulation of surface film properties by variable currents.
 - o. (U) Continued development of environmental data bases for use in test planning and detectability assessments.
2. (U) FY 1992 PROGRAM:
 - a. (U) Continue tactics development and operations analysis.
 - b. (U) Conduct sea tests to evaluate sensors for protection.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101224N

BUDGET ACTIVITY: 3

PROGRAM ELEMENT TITLE: SSBN Security Technology Program

PROJECT NUMBER: R0092

PROJECT TITLE: SSBN Security Technology

- c. (U) Continue programs in
 - d. (U) Conduct a major sea test to continue evaluation of sensor concepts, in mid-to-high noise environments.
 - e. (U) Conduct a major experiment to improve performance, test countermeasures, and evaluate tactics.
 - f. (U) Evaluate the vulnerability of submarines to detection by sensors.
 - g. (U) Upgrade the capabilities.
 - h. (U) Develop clutter reduction algorithms for data.
 - i. (U) Complete analysis of Standard Leopard I data.
 - j. (U) Develop and implement a receiver to improve discrimination.
 - k. (U) Conduct a detection test.
 - l. (U) Conduct noise measurements; develop a system employing noise data.
 - m. (U) Upgrade preliminary detectability assessment.
 - n. (U) Conduct signature measurements at Dabob Bay.
 - o. (U) Develop 3-D wake model to predict horizontal eddy generation.
 - p. (U) Develop model to predict
 - q. (U) Initial open ocean testing of sensor; develop optimized sensor.
 - r. (U) Validate signal model and develop empirical noise model with FY91 data.
 - s. (U) Measure effects of surface films on wind-waves by current gradients.
 - t. (U) Continue development of environmental data bases for use in test planning and detectability assessments.
 - u. (U) Conduct a vulnerability assessment.
 - v. (U) Conduct two sea tests to measure submarine characteristics.
 - w. (U) Conduct initial sea test to determine signature and background levels.
 - x. (U) Conduct final sea test in to determine false alarm statistics and effects using the
 - y. (U) Develop a highly sensitive meter.
 - z. (U) Convene working group to identify technical issues.
3. (U) FY 1993 PLANS:
- a. (U) Conduct sea tests to evaluate sensors for protection.
 - b. (U) Prepare detectability assessment of sensors. Continue detection measurements.
 - c. (U) Continue programs in
 - d. (U) Continue to evaluate protection concepts.
 - e. (U) Continue tactics development and operational assessments.
 - f. (U) Conduct field test and data analysis.
 - g. (U) Evaluate clutter reduction algorithms.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101224N

BUDGET ACTIVITY: 3

PROGRAM ELEMENT TITLE: SSBN Security Technology Program

PROJECT NUMBER: R0092

PROJECT TITLE: SSBN Security Technology

- h. (U) Perform detectability test.
- i. (U) Prepare preliminary detectability assessments for and prepare a final detectability assessment for
- j. (U) Validate by at-sea test.
- k. (U) Continue noise reduction program.
- l. (U) Initiate measurements.
- m. (U) Continue development of environmental data bases for use in test planning and detectability assessments.
- n. (U) Conduct second sea test to determine potential threat signatures and background levels.
- o. (U) Conduct final data analysis, update the Photo Luminescence Detectability Analysis (PDA) and close the program.
- p. (U) Perform proof of concept test of the meter for induced signatures.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: DTRC, Bethesda, MD; NAVOCEANSYSCEN, San Diego, CA; NAVOCEANO and NOARL, Bay St. Louis, MS; NUSC, New London, CT; NRL, Washington D.C.; NCEL, Port Hueneme, CA; NUWES, Keyport, WA; NAVAIRDEVCON, Warminster, PA. CONTRACTORS: Applied Physics Laboratory/Johns Hopkins University, Laurel, MD; SSBN Laboratories, Cambridge, MA; Arete Associates, Sherman Oaks, CA; Applied Research Laboratory/University of Texas; Applied Physics Laboratory/University of Washington; Radix Systems Inc., Rockville, MD;

E. (U) COMPARISON WITH REVISED FY 1992/3 PRESIDENT'S BUDGET:

- 1. (U) Technology changes: NONE
- 2. (U) Schedule changes: NONE
- 3. (U) Cost changes: Decrease of \$1.9M in FY 1993 due to pricing adjustments for inflation and DBOF rates.

F. (U) PROGRAM DOCUMENTATION: NAPDD #011-02 6/91

G. (U) RELATED ACTIVITIES: PE 0603588N, SSBN Survivability.

H. (U) OTHER APPROPRIATED FUNDS: None. This is a non-acquisition program.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Navy IPO is in the process of completing a Data Exchange Agreement with Canada on Electromagnetics Detection Technology.

J. (U) MILESTONE SCHEDULE: Continuing program; no milestones apply.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101226N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: Sub Acoustic Warfare Development
PROJECT NUMBER: S1265 PROJECT TITLE: Sub Acoustic Warfare Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1265	Submarine Countermeasure Development	30,897	36,347	40,694	CONT.	CONT.

B. (U) DESCRIPTION: This project develops a Submarine Defensive Warfare System (SDWS) to improve the effectiveness and survivability of all classes of US submarines. Project efforts consists of countermeasures devices, launchers, threat detection, and Command and Control systems. Specific devices in development are: ADC MK 4, an advanced sonar countermeasure device; MMD, a Mobile Multi-Function countermeasure device; NLQ-1, a special purpose countermeasure device; and SMTD, an advanced Submarine Torpedo Defense countermeasure device capable of interception and neutralization of future torpedo threat capabilities. Launcher development efforts are directed to external countermeasure launchers specifically configured to each submarine class for ready stowage and rapid launching of devices, including launcher quieting techniques to meet advanced submarine noise requirements. Threat detection and command and control efforts consist of development of NSIS, a New Sonar Intercept System which will have torpedo recognition capability for early threat acquisition, classification, tracking and a consolidated command and control subsystem for countermeasure inventory status, tactical solutions, and launch management of all on board countermeasure devices and launcher systems.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) CSA MK 2/Quiet Launch:
 - (1) (U) Continued SSN 688 system testing/awarded production contract.
 - (2) (U) Transitioned electromagnetic launch technology (EML) project from DARPA concept development.
 - (3) (U) Completed Quiet Launch Program start-up and associated documentation.
- b. (U) ADC MK 4:
 - (1) (U) Completed fabrication and testing of Engineering Development Model (EDM) units.
 - (2) (U) Commenced fabrication of Low-Rate Initial Production (LRIP) units.
- c. (U) NSIS:
 - (1) (U) Solicited competitive Prototype system contract.
 - (2) (U) Integrated countermeasure device command/control subsystem into design.
- d. (U) NLQ-1 Device:
 - (1) (U) Completed design, fabrication and testing of breadboard models.
 - (2) (U) Commenced Prototype model specification.
- e. (U) MMD Device:
 - (1) (U) Continued design, fabrication and test of Prototype model components.
- f. (U) SMTD Device:
 - (1) (U) Transitioned to Demonstration and Validation (D&V) Phase.
 - (2) (U) Developed program documentation and defined requirements.
 - (3) (U) Began modification of subsystem test vehicles.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101226N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: Sub Acoustic Warfare Development
PROJECT NUMBER: S1265 PROJECT TITLE: Sub Acoustic Warfare Development

2. (U) FY 1992 PROGRAM:
 - a. (U) ADC MK 4:
 - (1) (U) Complete fabrication of LRIP units.
 - (2) (U) Commence Technical and Operational Evaluations.
 - b. (U) QUIET LAUNCHER:
 - (1) (U) Complete Prototype model fabrication and testing.
 - (2) (U) Obtain Milestone II Engineering and Manufacturing Development (E&MD) approval.
 - c. (U) NSIS:
 - (1) (U) Award competitive Prototype system contract.
 - (2) (U) Complete Prototype system Preliminary Design Review (PDR) and Critical Design Review (CDR-1).
 - d. (U) NLQ-1 Device:
 - (1) (U) Complete Prototype model testing and obtain Milestone II approval.
 - (2) (U) Complete EDM specification and award E&MD Phase contract.
 - e. (U) MMD Device:
 - (1) (U) Complete Prototype model fabrication and testing.
 - f. (U) SMTD Device:
 - (1) (U) Complete documentation and requirements.
 - (2) (U) Complete subsystem/component specifications and procurement package.
 - (3) (U) Complete in-water testing of rear-end propulsion subsystem test vehicle.
3. (U) FY 1993 PLANS:
 - a. (U) ADC MK 4:
 - (1) (U) Complete Technical and Operational Evaluation.
 - (2) (U) Obtain Milestone III approval.
 - b. (U) QUIET LAUNCHER:
 - (1) (U) Complete EDM design.
 - (2) (U) Award E&MD Phase contract.
 - c. (U) NSIS:
 - (1) (U) Complete Prototype system fabrication and testing.
 - d. (U) NLQ-1 Device:
 - (1) (U) Complete EDM design, fabrication, and begin testing.
 - e. (U) MMD Device:
 - (1) (U) Obtain Milestone II approval.
 - (2) (U) Award E&MD Phase contract.
 - (3) (U) Begin EDM design.
 - f. (U) SMTD Device:
 - (1) (U) Complete Prototype model specification.
 - (2) (U) Complete fabrication and in-water testing of front-end propulsion subsystem test vehicle.

4. (U) PROGRAM TO COMPLETION: This is a continuing program

D. (U) WORK PERFORMED BY: IN-HOUSE: Naval Coastal Systems Station (NCSS), Panama City, FL; Naval Undersea Warfare Center (NUWC), New London Detachment/New London, CT. CONTRACTORS: NORDEN Systems, Melville, NY; Bendix Inc., Sylmar, CA; Librascope, Glendale, CA; Hazeltine Corp., Braintree, MA; EML Research, Hudson, MA.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101226N BUDGET ACTIVITY: 3
 PROGRAM ELEMENT TITLE: Sub Acoustic Warfare Development
 PROJECT NUMBER: S1265 PROJECT TITLE: Sub Acoustic Warfare Development

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Integrated Countermeasure Command/Control capability into NSIS system.
2. (U) SCHEDULE CHANGES: One year slip in ADC MK 4 Milestone III due to availability of OPEVAL test submarine with 6" launcher system.
3. (U) COST CHANGES: None.

F. (U) PROGRAM DOCUMENTATION:

SYSTEM	TOR	DOP	OR	TEMP
CSA MK2/QUIET LAUNCH	N/A	N/A	12/76	#581 REV 1 (08/90)
ADC MK 4	N/A	N/A	12/76	#1171 (03/88)
NSIS	9/85	6/86	9/90	#1351 IN PROCESS
NLQ-1	3/86	11/87	7/88	#1338 IN PROCESS
MMD	3/86	11/87	7/88	#1339 IN PROCESS
SMTD	2/88	5/92	6/92	TBD 9/92

G. (U) RELATED ACTIVITIES: None.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT					
OPN-BA-2	28,521	20,321	16,358	CONT.	CONT.
LI-56					

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE:

SYSTEM	DEM-VAL CONTRACT	MILESTONE II	ENG/MFG CONTRACT	OPEVAL	MILESTONE III (AFP)
QUIET LAUNCHER	N/A	FY/92	2Q/93	FY/96	FY/96
ADC MK 4	N/A	3Q/88	4Q/88	FY/92	FY/93
NSIS	FY/92	FY/94	FY/94	FY/97	FY/97
NLQ-1	N/A	FY/92	FY/92	FY/96	FY/97
MMD	N/A	FY/93	FY/93	FY/96	FY/97
SMTD	N/A	FY/96	FY/96	FY/99	FY/00

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101228N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: TRIDENT I
PROGRAM NUMBER: S0004 PROJECT TITLE: TRIDENT Sub System Improvements

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0004	TRIDENT I	34,263	35,446	24,892	CONT.	CONT.

B. (U) DESCRIPTION: The TRIDENT operational system development program conducts improvement and system integration to maintain OHIO Class submarine capability throughout the life cycle of this key element of the strategic deterrent of TRIAD. The OHIO Class submarine is a long term U.S. Navy program for the modernization and orderly replacement of earlier deployed submarine ballistic missile systems (POLARIS and POSEIDON). This program is required to maintain an effective strategic deterrent against the possibility of a nuclear attack on the U.S. or its allies. The Program consists of four major components (1) QE2 (MK2 Mod 3 Combat System, AN/BQQ-5E(V)4 Sonar), (2) External Communications Upgrades, (3) Command and Control System (CCS) Engineering and Integration (E&I), and (4) TRIDENT CCS Improvements.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- (U) Initiated development of the External Communications Upgrades: VLF Receive Terminal (VRT).
- (U) Initiated development of TRIDENT CCS Improvements: C&C Switchboard Design Modification.
- (U) Continued development of QE2, CCS E&I, and TRIDENT CCS Improvements.
- (U) Completed development of TRIDENT CCS Improvements: Type 15L Periscope Radar Absorbent Material (RAM), Ship Control OPEVAL, and AN/BPS-16 Radar.

2. (U) FY 1992 PROGRAM:

- (U) Initiate development of External Communications Upgrades: Extremely High Frequency Satellite Communications (EHF SATCOM), Advanced Narrowband Digital Voice Terminal (ANDVT/TACTERM), and AN/BRR-6() Antenna.
- (U) Continue development of QE2, External Communications Upgrades, CCS E&I, and TRIDENT CCS Improvements.
- (U) Complete development of External Communications Upgrades: AN/BRR-6() Antenna.
- (U) Complete development of CCS E&I: Revision 5.1.
- (U) Complete development of TRIDENT CCS Improvements: OE-207 Multifunction Mast (MFN).

3. (U) FY 1993 PLANS

- (U) Continue development of AN/BQQ-5E(V)4 sonar for QE2, External Communications Upgrades, CCS E&I, and TRIDENT CCS Improvements.
- (U) Complete development of MK2 Mod 3 Combat System (DO) for QE2.
- (U) Complete development of External Communications Upgrades: ANDVT/TACTERM.
- (U) Complete development of CCS E&I: Revision 5.3.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101228N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: TRIDENT I
PROGRAM NUMBER: S0004 PROJECT TITLE: TRIDENT Sub System Improvements

D. (U) WORK PERFORMED BY:

(U) QE2 - IN HOUSE: NWSC, Crane, IN; NUWC, Newport, RI. CONTRACTORS: IBM, Manassas VA; Raytheon, Portsmouth, RI; Martin Marietta Corp., Glen Burnie, MD.

(U) EXTERNAL COMMUNICATIONS UPGRADES - IN HOUSE: NOSC, San Diego, CA; SPAWAR SYSCOM, Washington, DC. CONTRACTORS: General Electric, Camden, NJ; Martin Marietta Corp., Glen Burnie, MD.

(U) CCS E&I - IN HOUSE: NUWC, Newport, RI. CONTRACTORS: Electric Boat Division of General Dynamics Corp., Groton, CT.

(U) TRIDENT CCS IMPROVEMENTS - IN HOUSE: NUWC, Newport, RI; DTRC, Bethesda, MD; NAVSSES, Philadelphia, PA. CONTRACTORS: Sperry Marine Inc., Charlottesville, VA; UNISYS, St. Paul, MN.

E. (U) COMPARISON WITH REVISED FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: None.

2. (U) SCHEDULE CHANGES: VRT will be delayed one year due to FY 1992 Congressional and other non-specific reductions. Additionally, EHF/SATCOM and QE2-BQQ-5 () development efforts were slowed for FY93 due to a reduction of 3.7M.

3. (U) COST CHANGES: None.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: PE 0101221N - FEM System; PE 0604363N - Trident II; PE 0101224N - SSEN Security Technical Program; PE 0101401N - ELF Communications; PE 0101402N - Navy Strategic Communications; PE 0604562N - Submarine Tactical Warfare System; PE 0604503N - Submarine Sonar Development. These programs all develop submarine requirements/hardware that directly impact the developmental efforts funded by this program element.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT:					
OPN (BA1) #21					
	55,998	37,844	36,093	CONT	CONT
OPN (BA2) #89					
	228,854	165,836	130,990	CONT	CONT
OPN (BA4) #185					
	20,965	25,792	14,766	CONT	CONT

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101228N

BUDGET ACTIVITY: 3

PROGRAM ELEMENT TITLE: TRIDENT I

PROGRAM NUMBER: S0004 PROJECT TITLE: TRIDENT Sub System Improvements

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) MILESTONE SCHEDULE:

Milestone	Date
QE2:	
Certification/Integration for SSBN 726	4/93
OPEVAL	12/93
EXTERNAL COMMUNICATIONS UPGRADE:	
VRT Development Starts	7/91
KHF SATCOM Development Starts	10/91
ANDVT/TACTERM Development Starts	11/91
ANDVT/TACTERM CCS Certification	2/93
AN/BRR-6 () Antenna CCS Certification	7/92
CCS E&I:	
CCS Rev 5.1 CCS Certification	12/91
CCS Rev 5.3 CCS Certification	3/93

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

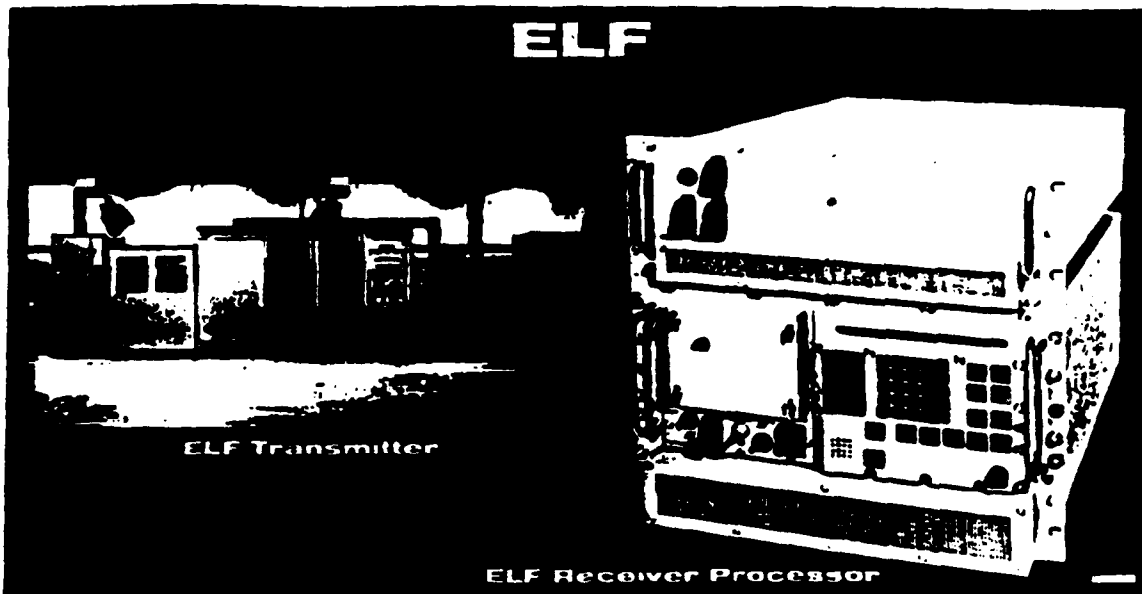
PROGRAM ELEMENT: 0101401N

BUDGET ACTIVITY: 3

PROGRAM ELEMENT TITLE: Extremely Low Frequency (ELF) Communications

PROJECT NUMBER: X0792

PROJECT TITLE: ELF Communications



A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program Milestones				POC 4Q/94
Engineering Milestones				
T&E Milestones				
Contract Milestones				
BUDGET(K)	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
Major Contract				
Support Contract				
In-House Support	103	533	590	Continuing
GFE/Other				
Total	103	533	590	Continuing

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101401M

BUDGET ACTIVITY: 3

PROGRAM ELEMENT TITLE: Extremely Low Frequency (ELF) Communications

PROJECT NUMBER: X0792

PROJECT TITLE: ELF Communications

B. (U) DESCRIPTION: The ELF communications system provides the Navy with a highly reliable means of transmitting short messages from submarine command authorities in the CONUS to submarines traveling at operational speeds and depths. The messages are transmitted from shore-based transmitters in the CONUS. From FY 1992 through mid-FY 1999, improved anti-jamming (AJ) and enhanced data rate (EDR) capabilities will be developed. Both hardware and software will be designed and modified and undergo testing to validate their improved resistance to jamming and enhanced data rate.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Completed collecting and analyzing mission data and optimized antenna patterns.
- b. (U) Continued AJ risk analysis.

2. (U) FY 1992 PROGRAM:

- a. (U) Start EDR studies and high level design.
- b. (U) Demonstrate EDR receiver concept.
- c. (U) Complete Operational Concept Utility Study for EDR System.

3. (U) FY 1993 PLANS:

- a. (U) Start development of Engineering Change Proposals for receiver and transmitter modifications for EDR.
- b. (U) Perform an At-Sea demonstration of the EDR concept.
- c. (U) Develop an Operational Concept for using the EDR.
- d. (U) Resume AJ trade-off studies.

4. (U) PROGRAM TO COMPLETE:

- a. (U) Attain system Full Operational Capability.
- b. (U) Develop design of EDR and AJ hardware and software modifications.
- c. (U) Perform software and hardware integration and testing of the EDR and AJ engineering changes.
- d. (U) Test and validate the EDR and AJ improvements.
- e. (U) Implement and deploy the EDR and AJ improvements.
- f. (U) This is a continuing program

D. (U) WORK PERFORMED BY: IN-HOUSE: NUWC, New London, CT CONTRACTORS: TBD

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101401N

BUDGET ACTIVITY: 3

PROGRAM ELEMENT TITLE: Extremely Low Frequency (ELF) Communications

PROJECT NUMBER: X0792

PROJECT TITLE: ELF Communications

E. (U) COMPARISON WITH FY 1992 PRESIDENT'S BUDGET:

1. TECHNOLOGY CHANGES: Not Applicable.
2. SCHEDULE CHANGES: Not Applicable.
3. COST CHANGES: Not Applicable.

F. (U) PROGRAM DOCUMENTATION:

Navy Decision Coordinating Paper (NDCP) (MS II)	10/82
NDCP (MS III)	6/87
Navy Program Decision Memorandum (NPDN) (MS III)	6/87
Integrated Logistic Support Plan (ILSP)	6/87
TEMP (Rev. 3)	6/91

G. (U) RELATED ACTIVITIES: The ELF communications capability is installed in: TRIDENT Submarines - PE 0101228N; Fleet Ballistic Missile Submarines - PE 0101221N.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

APPN/P-1	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
SCN SSN 21	459	490	490	TBD	TBD

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) TEST AND EVALUATION DATA: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101402N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: Navy Strategic Communications

A. (U) RESOURCES:

PROJECT NUMBER	TITLE	FY1991 ACTUAL	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMP.	TOTAL PROGRAM
X1083	Shore to Ship Comm					
		6,714	14,994	21,471	Cont.	Cont.
H0793	TACAMO	9,996	14,204	20,964	12,459	119,046
W1438	(E-6A) ECX	500	0	0	0	380,800
	TOTAL	17,210	29,198	42,435	Cont.	Cont.

B. (U) DESCRIPTION: This program develops communications systems which provide positive command and control of deployed ballistic missile submarines (SSBNs). This program also provides enhancements to current shore-to-ship transmitting and receiving systems and the TACAMO airborne communications relay aircraft. The Very Low Frequency/Low Frequency (VLF/LF) High Power Transmitter System (HPTS) and Dual Trailing Wire Antenna (DWT) Systems for the E-6A TACAMO and the Air Force National Emergency Airborne Command Post (E4B) are required to communicate with the strategic bomber, missile and submarine forces. Additional upgrades of the E-6A TACAMO systems are required to ensure communications compatibility with Strategic Connectivity System (SCS) aircraft, the USAF components that link TACAMO with other strategic communication platforms and systems. The Compact VLF system is an advanced, miniaturized VLF digital data processing receiving set that is designed to provide a reliable, functional replacement to the Navy's present VLF systems. This effort will result in increased transmitter reliability (lower maintenance costs), decreased operating costs (power bills), and more efficient reception capabilities in high noise areas of the world.

(U) The Fixed VLF/LF Program is a development effort to upgrade existing equipment to improve the performance of the VLF shore based transmitters and continue studies of atmospheric noise and signal propagation.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101402N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: Navy Strategic Communications
PROJECT NUMBER: X1083 PROJECT TITLE: Shore to Ship Communications

A. (U) RESOURCES:

PROJECT NUMBER	TITLE	FY1991 ACTUAL	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMP.	TOTAL PROGRAM
X1083	Shore to Ship Comm	6,714	14,994	21,471	Cont.	Cont.

B. (U) DESCRIPTION: This project develops communications systems elements which provide positive command and control of deployed ballistic missile submarines (SSBNs). This program provides enhancements to the shore-to-ship transmitting systems, shipboard receiver systems, and development of the Compact Very Low Frequency (CVLF) receiver system including a Pluggable Communications Security (COMSEC) Module (PCM). Continuing evaluation of this communications system is provided via the Strategic Communications Assessment Program (SCAP). Fixed VLF/Low Frequency (LF) develops an energy efficient, solid state, power amplifier for the VLF shore based transmitters of the submarine broadcast system, investigates improvement of the radio frequency high voltage insulators used in these stations through the High Voltage Insulator Program (HVIP), and measures and analyzes atmospheric noise and signal propagation through the Coverage Prediction Improvement Program (CPIP).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:

- (U) Conducted CDR for a modification to replace the obsolete CVLF microprocessor with the Pace Semiconductor 1750A
- (U) Continued Strategic Communications Assessment Program (SCAP)
- (U) Continued atmospheric studies Coverage Prediction Improvement Programs (CPIP)
- (U) Continued High Voltage Insulator Program (HVIP)
- (U) Started Solid State Power Amplifiers Replacement (SSPAR) engineering development
- (U) Continued Fixed Very Low Frequency (FVLF) Antenna Bandwidth Enhancement

2. (U) FY 1992 Programs:

- (U) Complete fabrication and retrofit of improved microprocessor in CVLF
- (U) Begin development of CVLF software improvements
- (U) Continue SCAP
- (U) Continue atmospheric studies for CPIP
- (U) Continue HVIP

3. (U) FY 1993 Plans:

- (U) Complete design and test of CVLF software improvements (PCM) for CVLF
- (U) Continue SCAP
- (U) Continue atmospheric studies (CPIP)
- (U) Continue HVIP
- (U) Complete preliminary design review of SSPAR engineering development model

4. (U) Program to Completion: This is a continuing program

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101402N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: Navy Strategic Communications
PROJECT NUMBER: X1083 PROJECT TITLE: Shore to Ship Communications

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVOCEANSYSCEN San Diego, CA; NRL Washington, DC; NAVELEXCEN, Vallejo, CA; NAVWPNSUPPCEN Crane, IN.; NAVCIVENGRLAB, Port Hueneme, CA. CONTRACTORS: MITRE Corp., McLean, VA; Johns Hopkins University Applied Physics Laboratory, Laurel, MD; Rockwell International Corp., Richardson, TX; Telephonics Corp., Farmingdale, NY.; C-Cubed Corp., Arlington, VA.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not Applicable.
2. (U) Schedule Changes: Not Applicable.
3. (U) Cost Changes: Not Applicable.

F. (U) PROGRAM DOCUMENTATION:

CVLF OR	6/86
CVLF TEMP 838-3 (Rev. 1)	8/89
CVLF Acquisition Plan	9/89
SSPAR OR	10/91
SSPAR Acquisition Plan	9/91

G. (U) RELATED ACTIVITIES:

PE 0101315N FBM Control Systems Communications

PE 0303131N MEECN

PE 0101315N provides the operational funds to maintain systems already developed under this PE. PE 0303131N contains development and operational funds for the related tri-service effort to ensure delivery of emergency action messages to the operating forces.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN #117	1670	1346	3981	TBD	TBD

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable

J. (U) MILESTONE SCHEDULE:

(U) Compact VLF (CVLF) Receiver System:	
Milestone III - Approval for Full Production (AFP)	12/92
(U) Pluggable COMSEC Module (PCM):	
Development/Operational Testing Complete	7/97
Milestone III	12/97
(U) Solid State Power Amplifier Replacement (SSPAR)	
Development/Operational Testing Complete	5/96
Milestone III - AFP	9/96

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101402N

BUDGET ACTIVITY: 3

PROGRAM ELEMENT TITLE: Navy Strategic Communications

PROJECT NUMBER: HO793

PROJECT TITLE: TACAMO

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
HO793	TACAMO	9,996	14,204	20,964	12,459	119,046

B. (U) DESCRIPTION: The VLF/LF HPTS and Dual Trailing Wire Antenna (DTWA) Systems for the E-6A TACAMO and the Air Force National Emergency Airborne Command Post (E-4B) are required to communicate with the strategic bomber, missile and submarine forces. The transmitter equipment (200KW) provides the E-6A TACAMO aircraft with a state-of-the-art system replacing tube-type equipment that is logistically unsupportable. The replacement DTWA will provide increased reliability and a third Utility Wire Antenna (UTWA) for redundant short or long wire capability.

(U) BLOCK II: Additional upgrades of the E-6A TACAMO systems are required to ensure communications compatibility within the Strategic Connectivity System (SCS), the system that links TACAMO with other strategic communications platforms and systems. Extremely High Frequency Military Strategic Tactical and Relay (EHF MILSTAR), MILSTAR Message Processor, Time/Frequency Standard Distribution System (T/FSDS), and Global Positioning System (GPS) upgrades will be installed aboard the E-6A TACAMO as a Block II Upgrade Program. In addition to providing the required E-6A/SCS compatibility, the installation of these systems will provide a significant increase in reliability and maintainability, enhance system communications capability, and provide increased supportability. Production of both HPTS and Block II are scheduled for concurrent installation as the E-6A Avionics Block Upgrade.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Installed HPTS prototype on E-6A
- b. (U) Delivered modified Flight Management Computer System prototype (FMCS) for GPS
- c. (U) Delivered MILSTAR message processor software
- d. (U) Began Engineering Development Model (EDM) development on T/FSDS
- e. (U) Commenced contractor ground and flight testing of HPTS in an E-6A

2. (U) FY 1992 PROGRAM:

- a. (U) Logistics Review Group (LRG) Audit for HPTS
- b. (U) Release Request For Proposal (RFP) for E-6A Avionics Block Upgrade contract for Engineering Manufacturing Development (EMD)
- c. (U) Begin Block EMD contract
- d. (U) Conduct Technical Evaluation (TECHEVAL) on E-6A HPTS
- e. (U) Conduct tailored Operational Evaluation (OPEVAL) on E-6A HPTS
- f. (U) Complete residual task/documentation for above OPEVAL

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101402N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: Navy Strategic Communications
PROJECT NUMBER: HO793 PROJECT TITLE: TACAMO

3. (U) FY 1993 PLANS:
 - a. (U) Continuation of E-6A Avionics Block Upgrade
 - b. (U) Continue Integration/Installation (INI) contractor EMD effort.
4. (U) PROGRAM TO COMPLETION:
 - a. (U) Finish installation and integration EMD phase for E-6A Avionics Block Upgrade, estimated completion date Sep 94
 - b. (U) Award contract for E-6A Avionics Block Upgrade production concurrent with HPTS production effort, estimated completion date Dec 99
- D. (U) WORKED PERFORMED BY: IN-HOUSE: NADC, Warminster, PA; NATC, Patuxent River, MD; NAC, Indianapolis, IN; NOSC, San Diego, CA; CONTRACTORS: Rockwell, Dallas, TX, for HPTS; Block Upgrade contract TBD
- E. (U) COMPARISON WITH FY-1992/3 PRESIDENT'S BUDGET:
 1. (U) TECHNOLOGY CHANGES: Not Applicable
 2. (U) SCHEDULE CHANGES: Not Applicable
 3. (U) COST CHANGES: The adjustment of \$+13.3M in FY93 is required for the following reasons: Preliminary analysis of the E-6A structural integrity as a result of the EHF MILSTAR addition (based upon data derived from the E-6A vertical fin flutter testing) indicated the requirement to use a smaller, lower profile antenna and radome. This smaller radome and antenna was developed for the EC-135. Additional computational fluid dynamics analysis and wind tunnel testing is required to accurately define the aerodynamic environment around the smaller radome and to determine it's effect on the vertical fin structure. Structural analysis of the fuselage is also required because it is necessary to penetrate the hull between a production break and the cargo door in order to accommodate the MILSTAR antenna. Finally, drogue position and after pressure bulkhead penetration caused by the HPTS UTWA addition caused air worthiness concerns. A UTWA redesign was required to eliminate the after pressure bulkhead penetration and remove the drogue from the area of the aircraft control cables.
- F. (U) PROGRAM DOCUMENTATION:
 1. (U) HPTS
 - a. (U) TEMP MAR 92
 - b. (U) ACQ PLAN AUG 86/JAN 92 (DRAFT)
 - c. (U) Operational Requirements Document (ORD) AUG 86
 - d. (U) Integrated Program Summary (IPS) SEP 92

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0101402N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: Navy Strategic Communications
PROJECT NUMBER: HO793 PROJECT TITLE: TACAMO

- 2. (U) E-6A AVIONICS BLOCK UPGRADE
 - a. (U) TEMP OCT 93
 - b. (U) ACQ PLAN APR 90
 - c. (U) IPS AUG 92

G. (U) RELATED ACTIVITIES:

- 1. (U) Program Element 0303131F, Minimum Essential Emergency Communications Network.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE CONTINUING	TOTAL PROGRAM CONTINUING
(U) PROCUREMENT (APN-5) #51	15,385	57,769	28,475		

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable

J. (U) MILESTONE SCHEDULE:

- 1. (U) HPTS
 - a. (U) Navy TECHEVAL MAR - JUN 92
 - b. (U) Navy OPEVAL MAR - JUN 92
 - c. (U) Complete EMD AUG 92
- 2. (U) E-6A AVIONICS BLOCK UPGRADE:
 - a. (U) Block II Equipment Development FY89 - FY92
 - b. (U) RFP Preparation (EMD) FY89 - FY91
 - c. (U) Contract Award (EMD) FY92
 - d. (U) Start Prototype Installation FY93
 - e. (U) TECHEVAL/OPEVAL FY93 - FY94

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0102427N

BUDGET ACTIVITY: 3

PROGRAM ELEMENT TITLE: Naval Space Surveillance System

PROJECT NUMBER: X0125

PROJECT TITLE: NAVSPASUR

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X0125	NAVSPASUR	860	799	905	Cont.	Cont.

B. (U) DESCRIPTION: The Naval Space Surveillance (NAVSPASUR) System is an integral component of the U.S. Space Command Detection and Tracking System providing continuous surveillance and unalerted detection of space objects crossing the continental U.S. NAVSPASUR is also the only space surveillance system which provides satellite vulnerability data to Fleet units. It is a multistatic continuous-wave radar fence consisting of three transmitter sites, six receiver sites, and a computational center. The transmitter and receiver sites are located on a great circle across the southern CONUS and the computational center is located at NAVSPASUR Headquarters in Dahlgren, VA.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:
 - a. (U) Began development and upgrade of Digital Receiver Replacement (DRR) at the six receiver sites.
 - b. (U) Initiated digital filter replacement development.
 - c. (U) Supported system analysis for OR development/tradeoffs.
2. (U) FY 1992 PROGRAM:
 - a. (U) Complete development and testing of DRR primary and secondary EDM (Engineering Development Model) system.
 - b. (U) Complete system design documentation for the DRR.
 - c. (U) Continue digital filter replacement development.
3. (U) FY 1993 PLANS:
 - a. (U) Research orbit improvement and processing alternatives.
 - b. (U) Complete digital filter replacement development.
4. (U) PROGRAM TO COMPLETION: This is a continuing program

D. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, DC.

E. (U) RELATED ACTIVITIES: None.

F. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN 100	3,196	2,894	97	Cont.	Cont.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

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FY 1993 RDT&E,N NAVY DESCRIPTIVE SUMMARY

Program Element: 0204134N

Budget Activity: 4

Program Element Title: A-6 Squadrons

Project Number: E1638 Project Title: A-6E Weapons Integration



POPULAR NAME: INTRUDER

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars In Thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program Milestones	250 OT 9/91	PROTO 300 DT 6/92	300 DT 3/93	CONTINUING
Engineering Milestones	300 SCRB/FRR 7/91	300 SWRR 3/92	300 CRIT DES REV 9/93	CONTINUING
T&E Milestones	250 RR 11/90	300 DISPLAY TEST PLAN	300 V/V TEST PLAN	CONTINUING
Contract Milestones	WST DEV COMPLETE 4/92			
BUDGET (\$K)	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL
Major Contract	14,200			30,500
Support Contract	24			
In-House Support	7,128	6,375	7,901	CONTINUING
GFE/ Other				
Total	21,352	6,375	7,901	CONTINUING

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FY 1993 RDT&E, NAVY DESCRIPTION SUMMARY

Program Element: 0204134N

Budget Activity: 4

Program Element Title: A-6 Squadrons

Project Number: E1638 Project Title: A-6E Weapons Integration

B. (U) DESCRIPTION: This Program Element funds the continuing development and/or integration of the A-6 avionics, weapon systems and air vehicle to accommodate these system changes. These changes enhance A-6 all-weather reliability/ maintainability, capability and survivability. It also provides funds for munition support and updating of the A-6 Operational Flight Program (OFF). The System Weapons Integration Program (SWIP) provides for integration of a variety of standoff weapons (HARM, HARPOON IC, IR Maverick, Laser Maverick, SLAM, and WALLEYE) along with the advanced data link pod (ANW-13). The SWIP Block 1A upgrade, which integrates an improved mission computer, navigation systems, display and defensive countermeasures, will be incorporated with the E/A 300 OFF. In addition, the completion of development of the A-6 Weapon System Trainer (WST) is funded under this PE. Advanced Bomb Family (ABF) and Advanced Interdiction Weapons System (AIWS) will be integrated as the weapons schedule allows. Schedule milestones are for operational flight computer programs E/A-250 and E/A-300 series software.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:

- a. (U) Commenced TECHEVAL on SLAM and ANW-13 Pod.
- b. (U) Completed DT/OT of E/A-250.
- c. (U) Conducted E/A-250 FOT&E.
- d. (U) Commenced integration of new displays and navigation systems.
- e. (U) Designed E/A-300 prototype software for Integrated Defense

Avionics Program (IDAP), displays and navigation system integration with A-6E and new mission computer.

- f. (U) Performed OPEVAL on SLAM and ANW-13 pod.
- g. (U) Continued development of A-6 WST.
- h. (U) Started laboratory testing of replacement Mission Computer

(CP-4).

2. (U) FY 1992 Program:

- a. (U) Complete E/A-300 prototype software design for IDAP, displays and navigation system integration with A-6E and new mission computer.
- b. (U) Conduct laboratory and flight tests to demonstrate that E/A-300 software meets requirements.
- c. (U) Complete software requirements specification for E/A-300 production software. Conduct the software requirements review.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0204134N Budget Activity: 4
Program Element Title: A-6 Squadrons
Project Number: E1638 Project Title: A-6E Weapons Integration

3. (U) FY 1993 Plans:

- a. (U) Conduct developmental flight testing of the E/A-300 prototype IDAP display and navigation software and complete the integration of the prototype display software.
- b. (U) Complete development of the E/A-300 (build 5) production OFF including IDAP, display, navigation, and weapons systems.
- c. (U) Conduct design review for the E/A-300 final production (build 7) OFF.

4. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY:

IN-HOUSE: NAC, Indianapolis, IN, NATC, Patuxent River, MD, NWC, China Lake, CA, NAVWPNEVALFAC, Albuquerque, NM, CONTRACTORS: Grumman Aerospace Corporation, Long Island, NY, McDonnell Douglas, Corporation, St. Louis, MO.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: NONE
2. (U) SCHEDULE CHANGES: NONE
3. (U) COST CHANGES: NONE

F. (U) PROGRAM DOCUMENTATION: NONE

G. (U) RELATED ACTIVITIES: P.E. 0205601N - HARM Improvement, P.E. 0603306N - Advanced Air Launched Air-to-Surface Missile System, P.E. 0604727N - Joint Standoff Weapons Systems, P.E. 0604270N - EW Development.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
PROCUREMENT					
APN-5 LI #25	1,255,843	21,470	156,598	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION DATA: See FY-1993 Congressional Data Sheet for A-6.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0204136N

Budget Activity: 4

Program Element Title: F/A-18 SQUADRONS

A. (U) RESOURCES: (Dollars in Thousands)

Project Number	Title	FY 1991 Actual	FY 1992 Estimate	FY 1993 Estimate	To Complete	Total Program
E1662	F/A-18 Improvements	11,905	16,181	13,763	Cont.	Cont.
E2065	F/A-18 Radar Upgrade	64,432	49,643	39,948	21,277	196,753
E2130	F/A -18 Follow-On Variant	8,000	351,123	1,079,878	Cont.	Cont.
TOTAL		84,337	416,947	1,133,589	Cont.	Cont.

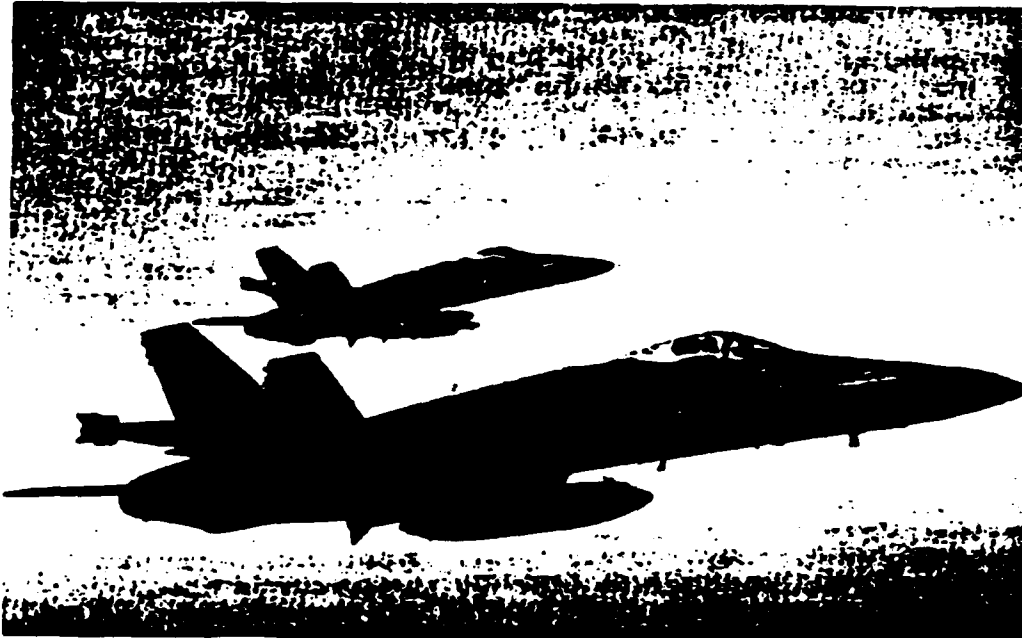
B. (U) DESCRIPTION: The F/A-18 is capable of using selected external equipment to perform either fighter or attack missions. The capabilities of the F/A-18 weapon system can be upgraded to accommodate and incorporate new or enhanced weapons as well as advances in technology to respond effectively to emerging future threats. Continued development capability is required to successfully optimize new F/A-18 weapon system capabilities in the Fleet. Additionally, continued improvements in reliability and maintainability are necessary to ensure maximum benefit is achieved through reduced cost of ownership and to provide enhanced availability. As F/A-18 squadrons report discrepancies and requirements, a continuing capability is needed to perform technical evaluations, investigative flight testing, software support, and incorporate pre-planned product improvements (i.e., capability enhancements). The F/A-18 radar (APG-65) will be upgraded (APG-73) to operate in the projected electronic warfare environment of the 1990's. The follow-on F/A-18 (E/F version) is an airframe upgrade incorporating increased capabilities, performance, and survivability necessary to satisfy the continuing requirement to implement new and more effective capability to counter emerging threats. The E/F version will have increased internal fuel capacity, carrier recovery payload, and engine thrust. It will retain all of the F3I efforts developed for the earlier C/D version of the aircraft.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0204136N Budget Activity: 4
 Program Element Title: F/A-18 SQUADRONS
 Project Number: E1662 Project Title: F/A-18 IMPROVEMENTS



POPULAR NAME: HORNET

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	To Complete
Program				
Milestones	(Program Milestones for this project are complete)			
Engineering				
Milestones				
T&E				
Milestones				
Contract				
Milestones				

BUDGET (\$K)	FY 1991	FY 1992	FY 1993	Program Total To Complete
Major				
Contract	4.580	10.700	7.879	Continuing
Support				
Contract	145			
In-House				
Support	3.480	2.500	2.684	Continuing
GFE/				
Other	3.700	2.981	3.200	
Total	11.905	16.181	13.763	Continuing

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0204136N

Budget Activity: 4

Program Element Title: F/A-18 SQUADRONS

Project Number: E1662 Project Title: F/A-18 IMPROVEMENTS

B. (U) DESCRIPTION: The F/A-18 is a multimission strike fighter aircraft that is used in fighter and attack roles through selected use of external equipment (such as external fuel tanks, targeting and navigation FLIR). The capabilities of the F/A-18 weapon system are being upgraded, to accommodate and incorporate new or enhanced weapons including the AMRAAM, IR Maverick, Harpoon, and SLAM as well as other advances in technology such as night attack, reconnaissance, enhanced performance engine and radar upgrade to respond effectively to emerging future threats. Continued development capability in terms of software and hardware improvements is required to successfully optimize new F/A-18 weapon system capabilities in the fleet. Continued improvements in reliability and maintainability for the airframe, avionics, and engines are necessary to ensure maximum benefit is achieved through reduced cost of ownership and enhanced availability. As F/A-18 squadrons report system problems and requirements, a continuing capability is needed to perform technical evaluation, investigative flight testing, software support, and incorporate capability enhancements.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:

- a. (U) Conducted contractor investigation of aeronautical design modifications/changes to the F/A-18 fuselage and any structural deficiencies identified during deployment of the F/A-18 aircraft.
- b. (U) Continued hardware and software integration tests for Advanced Tactical Airborne Reconnaissance Systems (ATARS)/ Reconnaissance (RECCE).
- c. (U) Continued flight testing at Naval Air Test Center (NATC), Patuxent River, Md and Naval Weapons Center (NWC) China Lake, Ca, centered around fleet reported problems and recommended improvements.
- d. (U) Initiated systems development and integration modifications to incorporate AIWS and AN/ARC-210.
- e. (U) Continued integration of Global Positioning System (GPS), Advanced Special Receiver, ALR-47, and the BQM-145 Unmanned Aerial Vehicle (UAV).
- f. (U) Investigated design efforts to integrate an all-weather reconnaissance capability into the AN/APG-73 radar (in lieu of a side looking radar pod).
- g. (U) Initiated development and integration of light weight gun.
- h. (U) Investigated integration and testing of the Advanced Airborne Expendable Decoy.

2. (U) FY 1992 Program:

- a. (U) Contractor investigation of aeronautical design modifications/changes to the F/A-18 fuselage, and any structural deficiencies identified during deployments of the F/A-18 aircraft.
- b. (U) Continue flight testing at NWC and NATC to resolve reported fleet problems and develop recommended improvements.
- c. (U) Continue hardware and software integration testing for ATARS/RECCE.
- d. (U) Initiate development of P3I design effort to incorporate an Air-to-Ground Multi-Sensor Integration capability in the aircraft.
- e. (U) Initiate design efforts to integrate light weight fuel cells into the aircraft.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0204136N Budget Activity: 4
Program Element Title: F/A-18 SQUADRONS
Project Number: E1662 Project Title: F/A-18 IMPROVEMENTS

- f. (U) Initiate integration testing of GPS, ALE-47, AIWS, BQM-145 (UAV), and the lightweight gun.
- g. (U) Continue preliminary development program required to integrate an all-weather reconnaissance capability into the AN/APG-73 radar (in lieu of a side looking radar pod).

3. (U) FY 1993 Plans:

- a. (U) Continue contractor investigation of aeronautical design modifications/changes to the F/A-18 fuselage and any structural deficiencies identified during deployment of the aircraft.
- b. (U) Continue flight testing at NWC and NATC to resolve reported fleet problems and develop recommended improvements.
- c. (U) Complete ATARS/RECCE integration flight testing at NATC.
- d. (U) Continue integration of AIWS, BQM-145 (UAV), and the lightweight gun.
- e. (U) Development of P3I design approach to incorporate an Air-to-Ground Multi-Sensor Integration capability into the aircraft.
- f. (U) Complete GPS and ALE-47 integration efforts.

4. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NADC, Warminster, PA; NAEC, Lakeland, NJ; NADC, Trenton, NJ; NOS, Indian Head, MD; NWC, China Lake, CA; NAVWPENGSUPACT, Washington, D.C.; PMTC, Point Mugu, CA; NATC, Patuxent River, MD; NRL, Washington, D.C.; OPTVFOR Norfolk, VA; CONTRACTORS: McDonnell Aircraft Company, St. Louis, MO (Airframe and Weapon System integration); General Electric Company, Lynn, MA (F-404 Engine); Hughes Aircraft Company, Culver City, CA (Radar subcontractor to McDonnell); Northrop Aircraft Division, Hawthorne, CA (center/aft fuselage subcontractor to McDonnell); Control Data Corporation, Minneapolis, MN (ATARS).

E. (U) COMPARISON WITH REVISED FY 1992/3 PRESIDENT'S BUDGET:

- 1. (U) TECHNICAL CHANGES: None.
- 2. (U) SCHEDULE CHANGES: None.
- 3. (U) COST CHANGES: None.

F. (U) PROGRAM DOCUMENTATION:

F/A-18 DCP	9/86
F/A-18 C/D TEMP	9/87

G. (U) RELATED ACTIVITIES: P.E. 0604214N AV-8B; P.E. 0604314N AMRAAM; P.E. 0603306N Advanced Air Launched Air-to-Surface Missile System; P.E. 0604727N AIWS; P.E. 0604270N EW Development; P.E. 0604777N NAVSTAR GPS; P.E. 0305141D BQM-145; P.E. 0603313N I2R MAVERICK; P.E. 0603261N ATARS/RECCE; P.E. 0204163N AN/ARC-210.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT:					
APW-1/6	1,771,701	2,171,626	1,808,595	7,306,849	13,058,771
APW-5	23,579	28,431	30,021	663,783	745,814

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: See FY 1993 Congressional Data Sheets.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0204136N Budget Activity: 4
 Program Element Title: F/A-18 SQUADRONS
 Project Number: E2065 Project Title: F/A-18 RADAR UPGRADE

POPULAR NAME: RADAR UPGRADE (RUG)

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	To Complete
Program	IIA-1		IIA-2	IIA-3 IOC
Milestones	(LRIP-1) 6/91	(LRIP-2) 3/93	(LRIP-3) 4/94	9/95
Engineering	CDR(H/W)	CDR(S/W)		
Milestones	4/91	12/91		
T&E	BNCH TST		OT-IIA	OT-IIB-1 OT-IIB-2
Milestones	6/91		12/92	1/94 9/94
Contract	LRIP-1			
Milestones	6/91			

BUDGET (\$K)	FY 1991	FY 1992	FY 1993	Program Total To Complete
Major				172,826
Contract	62,420	46,600	28,000	15,276
Support				550
Contract			200	350
In-House				23,307
Support	2,012	3,043	11,748	5,651
GFE/ Other				196,753
Total	64,432	49,643	39,948	21,277

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0204136N Budget Activity: 4
Program Element Title: F/A-18 SQUADRONS
Project Number: E2065 Project Title: F/A-18 RADAR UPGRADE

B. (U) DESCRIPTION: The F/A-18 radar (AN/APG-65), requires an upgrade to improve electronic counter-countermeasure (ECCM) performance against improved threat electronic countermeasures (ECM). This threat ECM improvement has partially resulted from compromises in the F/A-18 radar performance against various threat electronic warfare systems. The AN/APG-73 radar follows and capitalizes on AN/APG-70 and AN/APG-71 developmental and value engineering programs to maximize shop replaceable assembly (SRA) commonality.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:

- a. (U) Completed installation of MCAIR benches.
- b. (U) Performed bench integration with Mission Computers and displays.
- c. (U) Continued hardware design/development.
- d. (U) Fabricated, assembled and delivered Engineering Development Models (EDM) radars.
- e. (U) Completed software Critical Design Reviews.
- f. (U) Initiated roofhouse integration and testing of radar hardware and software.
- g. (U) Completed Operational Assessment.
- h. (U) Conducted Hardware Critical Design Review.
- i. (U) Conducted Production Readiness Review.
- j. (U) Milestone II A-1 Low Rate Initial Production (LRIP) decision.

2. (U) FY 1992 Plans:

- a. (U) Continue roofhouse integration and testing of radar hardware and software.
- b. (U) Initiate contractor flight testing of hardware and software design.
- c. (U) Commence operational testing of hardware design/developments and software design/coding.
- d. (U) Complete software Critical Design Review, Block VI.
- e. (U) Program Review for procurement authorization of long lead items.
- f. (U) Complete Logistics Review Group (LRG) audit.
- g. (U) Complete installation of China Lake benches.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0204136N Budget Activity: 4
Program Element Title: F/A-18 SQUADRON
Project Number: E2065 Project Title: F/A-18 RADAR UPGRADE

3. (U) FY 1993 Plans:
 - a. (U) Complete contractor flight testing of hardware and software designs.
 - b. (U) Conduct Operational Test Readiness Review prior to commencement of OPEVAL OT-IIB-1.
 - c. (U) Milestone II A-2 LRIP-2 Decision.
 - d. (U) Complete operational testing OT-IIA phase.
4. (U) Program to Completion:
 - a. (U) Continue operational testing of hardware design/developments and software design/coding.
 - b. (U) Conduct TECHEVAL DT-IIC.
 - c. (U) Complete OPEVAL I and II.
 - d. (U) Engineering and Manufacturing Program completes in FY 1994.
 - e. (U) Milestone IIA-3 for LRIP-3 authorization.
 - f. (U) Milestone III Full Rate Production Decision
- D. (U) WORK PERFORMED BY: IN-HOUSE: NADC, Warminster, PA; NAEC, Lakehurst, NJ; NWC, China Lake, CA; NAVWPNEGSUPACT, Washington, D.C.; PMTC, Point Mugu, CA; NATC, Patuxent River, MD; NRL, Washington, DC. CONTRACTORS: McDonnell Aircraft Company, St. Louis, MO (Airframe and Weapon System Integration); Hughes Aircraft Company, Culver City, CA (Radar subcontractor to McDonnell).
- E. (U) COMPARISON WITH REVISED FY 1992/3 PRESIDENT'S BUDGET:
 1. (U) TECHNICAL CHANGES: Not applicable.
 2. (U) SCHEDULE CHANGES: TECHEVAL slips from FY93 to FY94.
 3. (U) COST CHANGES: FY1993 decrease of \$1,708K associated with pricing adjustments.
- F. (U) PROGRAM DOCUMENTATION:

OR #199-05-88 promulgated - 27 Jan 88.
- G. (U) RELATED ACTIVITIES: P.E. 0205667N F-14D radar development is directly related to the AN/APG-65 upgrade due to hardware (SRA) commonality.
- H. (U) OTHER APPROPRIATION FUNDS: Radar Upgrade (APG-73) procurement is included in F/A-18 APW.
- I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Memorandum of Understanding signed by Canada on 30 March 1990 for cooperative development agreement. FY90 Canadian contribution totals \$38.5M. Nunn Amendment funding applied to this program was \$13.6M in FY-90.
- J. (U) TEST AND EVALUATION: See FY 1993 Congressional Data Sheets.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0204136N Budget Activity: 4
 Program Element Title: F/A-18 SQUADRONS
 Project Number: E2130 Project Title: F/A-18 FOLLOW-ON VARIANT

POPULAR NAME: HORNET

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	To Complete	
Program		IV/II		III	IOC
Milestones		3/92		2ndQTR/00	FY00
Engineering		IDR	PDR	CDR	1st Flt
Milestones		7/92	6/93	2ndQTR/94	1stQTR/96
T&E					OT-IIC
Milestones					3rdQTR/99
Contract		END CONTRACT			AAC LRIP-1
Milestones		3/92			1stQTR/96

BUDGET (\$K)	FY 1991	FY 1992	FY 1993	Program Total To Complete
Major				
Contract	7.975	309.000	993.313	Cont.
Support				
Contract		1.026	1.062	Cont.
In-House				
Support	25	34.660	65.303	Cont.
GFE/				
Other		6.437	20.200	Cont.
Total	8.000	351.123	1,079.876	Cont.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0204136N Budget Activity: 4
Program Element Title: F/A-18 SQUADRONS
Project Number: E2130 Project Title: F/A-18 FOLLOW-ON VARIANT

B. (U) DESCRIPTION: The F/A-18 is a twin engine, mid-wing multi-mission tactical aircraft employed in Navy and Marine Corps strike fighter squadrons. The F/A-18, through selected use of external equipment, is designed for flexibility in fighter, attack, fleet air defense, and close air support roles. The F/A-18 E/F variant is an upgrade to the night attack "C" and "D" models. The F/A-18 E/F will be the second major upgrade since the program's inception. The aircraft incorporates an enlarged wing surface and fuselage modification, improved performance engines and upgraded survivability suite to increase mission radius payload flexibility, carrier recovery payload, preplanned product improvements (P3I) potential and overall survivability. This will allow the F/A-18 to continue its strike fighter role against advanced threats into the next century.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:
 - a. (U) Initiated system engineering studies to reduce risk and provide data for configuration definition.
 - b. (U) Initiated engine risk reduction effort.
2. (U) FY 1992 Program:
 - a. (U) Continue system engineering studies to reduce risk and provide data for configuration definition.
 - b. (U) Aircraft Configuration Definition based on the results of engineering studies.
 - c. (U) Detailed Specification generation.
 - d. (U) Continue engine risk reduction effort.
 - e. (U) Detailed specification review and approval.
 - f. (U) Milestone II decision.
 - award. g. (U) Engineering and Manufacturing Development (E&MD) contract
 - h. (U) Contractor E&MD aircraft design, analysis, and model testing.
 - i. (U) Subsystem design and testing.
 - j. (U) Software preliminary design.
 - k. (U) Conduct Initial Design Review.
3. (U) FY 1993 Plans:
 - a. (U) Continue all engineering and manufacturing design activity leading to the development of the airframe and engine.
 - b. (U) Conduct Preliminary Design Review.
 - c. (U) First engine testing/engine development tests.
 - d. (U) Conduct preproduction component tests.
 - e. (U) Conduct flight simulation.
4. (U) Program to Completion:
 - a. (U) Continue E&MD leading to first flight in FY 1996.
 - b. (U) Longlead for LRIP 1 decision anticipated in FY 1996 (LRIP 1 decision anticipated in FY 1997).

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0204136N Budget Activity: 4
Program Element Title: F/A-18 SQUADRONS
Program Number: E2130 Project Title: F/A-18 FOLLOW-ON VARIANT

D. (U) WORK PERFORMED BY: IN-HOUSE: NADC, Warminster, PA; NAEC, Lakehurst, NJ; NAPC, Trenton, NJ; NOS Indian Head, MD; NWC, China Lake, CA; NAVPNENG SUPACT, Washington, D.C.; PMTC, Point Mugu, CA; NATC, Patuxent River, MD; NRL, Washington, D.C.; NAC Indianapolis, IN; MATSF Philadelphia, PA; PSD North Island, CA; CONTRACTORS: McDonnell Aircraft Company, St. Louis, MO (Airframe and Weapon System Integration); General Electric Company, Lynn, MA (F-404 Engine); Hughes Aircraft Company, Culver City, CA (Radar subcontractor to McDonnell); Northrop Aircraft Division, Hawthorne, CA (center/aft fuselage subcontractor to McDonnell).

E. (U) COMPARISON WITH REVISED FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: The F/A-18 /F development program schedule has been restructured to allow 42 months from contract award to first flight vice 36 months. The following milestones have been adjusted to support the restructured schedule: PDR was moved from 11/92 to 6/93. CDR was adjusted from 5/93 to 2nd QTR FY94. First flight is planned for 1st QTR FY96 instead of 2nd QTR FY95. The Advanced Acquisition contract for low rate initial production is scheduled for 1st QTR FY96. OT-IIC (OPEVAL) was restructured from 3rd QTR FY98 to 3rd QTR FY99 to support a full rate production decision and IOC in FY00 instead of FY99.

3. (U) COST CHANGES: Net adjustment of +\$134,678 in FY93 allows for increase of manufacturing design efforts for the airframe E&MD program.

F. (U) PROGRAM DOCUMENTATION: ORD (19 December 1991) Other documentation required by DODI 5000.2 being prepared.

G. (U) RELATED ACTIVITIES: P.E. 0604214N AV-8B; P.E. 0604314N AMRAAM; P.E. 0603306N Advanced Air Launched Air-to-Surface Missile System; P.E. 0604727N AIWS; P.E. 0604270N, EW Development; P.E. 0604777N NAVSTAR GPS; P.E. 0305141D BQM-145 (UAV); P.E. 0603261N ATARS/RECCE; P.E. 0204163N Fleet Communications.

H. (U) OTHER APPROPRIATION FUNDS: Procurement funds in APN-1 in the out years.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

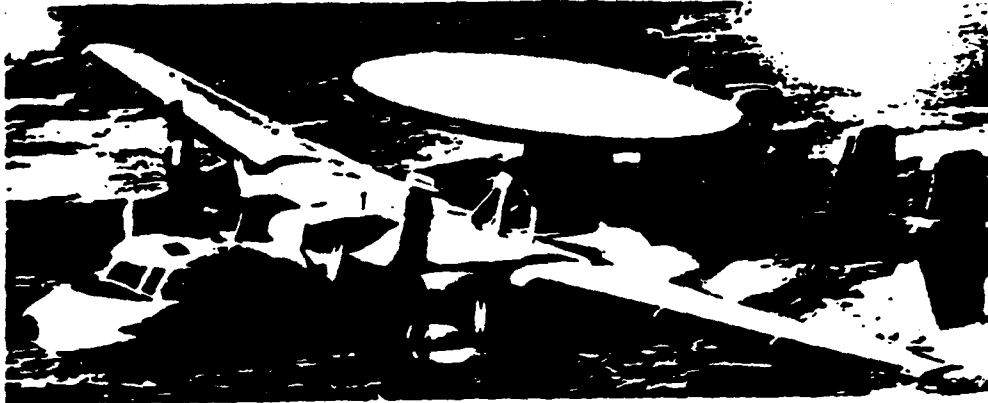
J. (U) TEST AND EVALUATION: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204152N BUDGET ACTIVITY: 4
 PROGRAM ELEMENT TITLE: E-2 SQUADRONS
 PROJECT NUMBER: E0463 PROJECT TITLE: AEW-CV/BASED A/C E2C



POPULAR NAME: HAWKEYE

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program	UDP II		UDP II	
Milestones	MSIIIA 5/91 (LRIP)		MSIII 2/93 (FRP)	
Engineering Milestones				
T&E		UDP II/OT-IIE 7/92		
Milestones	UDP II/DT-IID 3/92		OT-III 3/93	
	UDP II/DT-IIE 1/92		OT-IV 9/94	
Contract Milestones				
BUDGET (\$K)	FY 1991	FY 1992	FY 1993	To Complete Program Total
Major Contract	21,800	1,408	-0-	-0- 256,308
Support Contract	100	81	64	-0- 1,945
In-House Support				
GFE/ Other	13,768	4,779	6,592	-0- 94,806
TOTAL	35,668	6,268	6,656	353,059

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204152N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: E-2 SQUADRONS
PROJECT NUMBER: E0463 PROJECT TITLE: AEW-CV/BASED A/C E2C

B. (U) DESCRIPTION: The E-2C is an all-weather, carrier-based airborne early warning aircraft, with a crew of five. This weapon system extends the task force defense perimeter by providing early warning of approaching enemy units (surface and air), vectoring of interceptors into attack position, and providing air and surface situation data to other fleet elements. This program provides preplanned product improvements for the evolution of E-2C aircraft capability in support of naval warfare command and control requirements. It funds development for the modification/replacement of selected weapon replaceable assemblies of current installed E-2C subsystems. These expanded capabilities will permit offensive weapons systems to be more effective in countering the tactical threat thus enhancing the Navy's warfighting capability. Included are two sub-projects: Update Development Program (UDP) Groups I and II. Group I modifications to the APS-138 radar resulted in redesignation as APS-139. Improvements include improved surface detection in high sea state/clutter, improved counter-measures, and automatic channel monitor/selection capability. Modifications to the tactical program include increased active track capacity, display prioritization and new radar controls. Group II modifications to the APS-139, or combined Group I and II modifications to the APS-138, result in redesignation as APS-145. Improvements include extended range and the environmental processor.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:
 - a. (U) Completion of Operational Testing OT-IIC.
 - b. (U) Approval of Milestone IIIA (Low Rate Initial Production).
2. (U) FY 1992 Program:
 - a. (U) Commence Developmental Testing (DT-IID/DT-IIIA) Technical Evaluation/Board of Inspection and Survey (TECHEVAL/BIS) of Group II.
 - b. (U) Commence software ground and flight test evaluation, DT-IIE, for Group II.
 - c. (U) Conduct operational evaluation for Group II (OT-IIE).
3. (U) FY 1993 Plans:
 - a. (U) Conduct follow on Test and Evaluation (T & E), Group II (OT-III).

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204152N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: E-2 SQUADRONS
PROJECT NUMBER: E0463 PROJECT TITLE: AEW CV-BASED A/C E2C

4. (U) Program to Completion:
a. (U) Conduct follow on T & E, Group II (OT-IV). Completion date 9/94.
b. (U) Program Completed.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRTESTCEN, Patuxent River, MD; NRL, Washington, DC; FLTCOMBATDIRSSACT, San Diego, CA; NAVAIRDEVCEEN, Warminster, PA. CONTRACTORS: Grumman Aerospace Corporation, Bethpage, NY; General Electric, Utica, NY.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not Applicable.
2. (U) Schedule Changes:
a. (U) DT-IIE slipped one month due to software not fully ready.
b. (U) Delay in receipt of FY92 R&D funding precluded commencement of DT-IID as scheduled.
3. (U) Cost Changes: Not Applicable.

F. (U) PROGRAM DOCUMENTATION:

OR 31-20	12/66
DCP (Rev 1)	6/71
DCP W-0463-AA	12/90
TEMP 760 (Rev 4)	12/90

G. (U) RELATED ACTIVITIES: P.E. 0602232N, Command and Control Technology and P.E. 0602111N, AAW/ASUW Technology, for radar system improvements.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Millions)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT					
APW 1/6	432.1	528.6	96.2	29.1	6,126.3

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) TEST AND EVALUATION: This information is included in the FY 1993 Congressional Data Sheets.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204163M

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Fleet Telecommunications (Tactical)

A. (U) RESOURCES: (DOLLARS IN THOUSANDS)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0661	COMBINATION RADIO	3,169	4,319	3,859	560	53,061
X0725	COMMUNICATION AUTOMATION	4,645	9,659	9,457	Cont.	Cont.
X2083	SHIPBOARD SINCGARS/VHF RELAY PALLET	2,443	1,342	4,235	3,289	14,621
X2074	COMM SUPPORT SYSTEM (CSS)	*0	2,875	6,433	Cont.	Cont.
	TOTAL	10,257	18,195	23,984	3,849	Cont.

* \$1.2M was funded in X0725

B. (U) DESCRIPTION: This program develops an anti-jam radio system incorporating shipboard interfaces, interference mitigation, Radio Frequency distribution (including antennas), high speed burst data transmission and relocatable VHF relay. It provides for integration of Electronic Counter-Counter Measures (ECCM) radios in Navy ships and replaces existing antiquated very high frequency (Frequency Modulated) radios.

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FY 1993 RDT&E, NAVY DESCRIPTION SUMMARY

PROGRAM ELEMENT: 0204163N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: FLEET TELECOMMUNICATIONS (TACTICAL)
PROJECT NUMBER: W0661 PROJECT TITLE: COMBINATION RADIO

C. (U) DESCRIPTION: This project develops airborne tactical jam-resistant radio systems providing DOD/NATO interoperability. The AN/ARC-210 Electronic Counter Counter-Measures (ECCM) Combination Radio provides small, jam-resistant UHF/VHF communications utilizing HAVEQUICK I/II and Single Channel Ground and Airborne Radio System (SINCGARS) waveforms. It is planned to incorporate the Downed Aircrew Locating System (DALs) and SATURN (NATO HAVEQUICK IIA) capabilities. Aircraft users include CH-53E, CH-46, UH-1N, F/A-18C, T/AV-8B, AH-1W, KC-130F/R/T; Air Force B-52; Army ASC-15.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:
 - a. (U) Completed F/A-18 TECHEVAL (Feb 1991) for AN/ARC-210 ECCM Radio.
 - b. (U) Started F/A-18 OPEVAL for AN/ARC-210 ECCM Radio.
 - c. (U) Started AN/ARC-210 helo integration.
2. (U) FY 1992 PROGRAM:
 - a. (U) Complete F/A-18 OPEVAL (Oct 1991) for AN/ARC-210 ECCM Radio.
 - b. (U) Complete AN/ARC-210 helo integration.
 - c. (U) Conduct AN/ARC-210 helo TECHEVAL and OPEVAL.
 - d. (U) Obtain Milestone III production decision for AN/ARC-210.
 - e. (U) Develop SATURN waveform capability into AN/ARC-210.
 - f. (U) Develop DALs capability into AN/ARC-210.
3. (U) FY 1993 PLANS:
 - a. (U) Incorporate SATURN waveform and DALs into AN/ARC-210 and start validation testing.
4. (U) PROGRAM TO COMPLETION:
 - a. (U) Complete validation testing of DALs and SATURN.

E. (U) WORK PERFORMED BY: IN-HOUSE: NADC, Warminster, PA; NATC, Patuxent River, MD; NAC, Indianapolis, IN. CONTRACTOR: Rockwell-Collins, Cedar Rapids, IA; McDonnell Aircraft Co., St. Louis, MO; VITRO Corp., Silver Spring, MD; Chelton Electrostatics, London, UK.

F. (U) RELATED ACTIVITIES: Air Force HAVEQUICK/HAVESYNC, Program Element 0207423F; Army SINCGARS, Program Element 0604805A.

G. (U) OTHER APPROPRIATION FUNDS: Applicable airframe appropriations that will have the AN/ARC-210 installed for future testing/production installations to include: CH-53E, CH-46, UH-1N, F/A-18C, T/AV-8B, AH-1W, KC-130F/R/T; Air Force B-52; Army ASC-15.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENT: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204163N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Fleet Telecommunications (Tactical)
PROJECT NUMBER: X0725 **PROJECT TITLE:** Communications Automation (COMM AUTO)

C. (U) DESCRIPTION: Navy Modular Automated Communications System (NAVMACS): Automate the message receiving, distribution and preparation functions aboard ships. High Speed Fleet Broadcast (HSFB): Resolves long standing throughput and system flexibility shortcomings by replacing the existing Fleet Broadcast with a more efficient, volume responsive broadcast.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) **FY 1991 ACCOMPLISHMENTS:**
 - a. (U) HSFB: Applied Versa Modular Europa (VME) standards for prototypes.
 - b. (U) CSS: Developed plans for evolutionary implementation and transition.
 - c. (U) CSS: Provided CSS specification requirements for EHF-IXS/TACINTEL II.
 - d. (U) CSS: Performed initial simulations to evaluate system performance.
 - e. (U) CSS: Completed design specification and commenced development of Modular Security Device.
 - f. (U) CSS: Defined requirements for CSS emulation testing.
2. (U) **FY 1992 PROGRAM:**
 - a. (U) HSFB:- Start system testing and procure ten Engineering Development Model (EDM) systems for fleet demonstration.
 - b. (U) NAVMACS: Develop NAVMACS II Local Area Network and Common User Digital Information Exchange System (CUDIXS) high data rate interfaces.
3. (U) **FY 1993 PLANS:**
 - a. (U) HSFB:- Procure 50 HSFB systems to populate one comm area and 2 deployed battle groups to conduct development and operational tests (DT/OT) and achieve Milestone III production decision.
 - b. (U) NAVMACS:- Develop Personal Computer and other existing shipboard LAN interfaces.
4. (U) **PROGRAM TO COMPLETION:**
 - a. (U) HSFB:- Development completed in FY 1994.
 - b. (U) NAVMACS II: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NESEC Portsmouth, VA. **CONTRACTORS:** RJO Enterprises Inc, Lanham, MD; SENCOR, Arlington, VA.

F. (U) RELATED ACTIVITIES: Not Applicable.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991	FY 1992	FY 1993	TO	TOTAL
	ACTUAL	ESTIMATE	ESTIMATE	COMPLETE	PROGRAM
OPN #113	0	6,701	8,086	Cont.	Cont.
SCN	0	1,000	1,000	Cont.	Cont.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204163N BUDGET ACTIVITY: 4
 PROGRAM ELEMENT TITLE: Fleet Telecommunications (Tactical)
 PROJECT NUMBER: X2083 PROJECT TITLE: SHIPBOARD SINGARS/VHF RELAY SEGMENT

C. (U) DESCRIPTION: This project will provide Very High Frequency (Frequency Modulation) (VHF(FM)) jam resistant communications and Digital Communications Terminals (DCTs) for Naval Surface Fire Support and Amphibious Ships, and a VHF relay segment. Shipboard SINGARS is based on a Non-Development Item (NDI) radio. This project will develop interference mitigation and interface equipment.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:
 - a. Continued development of Relay Segment
 - b. Conducted Preliminary Design Review (PDR) of Relay Segment
 - c. Commenced development/integration of Shipboard SINGARS radios and VRC-46 replacement
 - d. Conducted System Design Review (SDR) of Ship Segment
2. (U) FY 1992 PROGRAM:
 - a. Conduct Critical Design Review (CDR) of Relay Segment
 - b. Conduct CDR of Ship Segment
 - c. Complete first Engineering Development Model (EDM) of Relay Segment
 - d. Complete TEMP
3. (U) FY 1993 PLANS:
 - a. Install Ship Segment EDMs aboard 2 ships and test and certify single channel Shipboard SINGARS and VRC-46 Replacement systems
 - b. Complete fabrication of Relay Segment EDMs
 - c. Commence test of Ship/Relay Segments
4. (U) PROGRAM TO COMPLETION:
 - a. Conduct TECHEVAL/OPEVAL on single channel Ship Segment and Relay Segment
 - b. Achieve approval for production for single channel Ship Segment and airborne relay

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVAVIONICEN, Indianapolis, IN; NRL, Washington, DC; NAVELEXCEN, Portsmouth, VA; CONTRACTOR: VITRO Corporation, Silver Spring, MD; MITRE Corporation, McLean, VA.

F. (U) RELATED ACTIVITIES: PE 0604805A, SINGARS-Army is lead service for tri-service efforts to insure SINGARS interoperability among services and platforms. Additionally the Army is providing the receiver-transmitter units to be integrated into the shipboard system

G. (U) OTHER APPROPRIATION FUNDS:	(Dollars in Thousands)				
	FY1991 ACTUAL	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMP CONT	TOTAL PROGRAM CONT
OPN P-1 #114	0	0	1797		

H. (U) INTERNATIONAL COOPERATIVE AGREEMENT: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204163N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Fleet Telecommunications (Tactical)
PROJECT NUMBER: X2074 PROJECT TITLE: Communications Support System (CSS)

C. (U) DESCRIPTION: This project is an initiative to develop an integrated Navy communication system architecture based on shared use of links and multimedia networks. It will provide increased communication survivability, throughput and security. CSS will further integrate the approach to research, development, acquisition and deployment of a total C3I system supporting Navy missions. The work to be performed is a system engineering effort that generates engineering solutions and guidelines, prototyping and early operational capabilities, and transition plans involving all current and planned Navy communication systems. Further, CSS will provide the information transfer implementation of the Copernicus TADIXS concept.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: (Funded and listed under PE 0204163/Project X0725)

2. (U) FY 1992 PROGRAM:

- a. (U) Prototype Copernicus Command TADIXS with early operational capability
- b. (U) Provide virtual service for voice, video, facsimile, and data
- c. (U) Design force operational TADIXS for multimedia
- d. (U) Finalize CSS system level architecture
- e. (U) Define CSS security policy
- f. (U) Complete CSS requirements definition

3. (U) FY 1993 PLANS:

- a. (U) Early Operational Capability of Force Operations TADIXS, a dynamic Time Division Multiplex Access (TDMA) packet switched service to tactical data users.
- b. (U) Design High Command (HICOM) TADIXS (FY94 installation)
- c. (U) Design Aircraft Implementation for CSS
- d. (U) Design Multimedia Mission Area Subnet Virtual Networks, a circuit switch and Resource Control and Monitoring subsystem.
- e. (U) Design resource planning, monitoring, and management software for the SEW Commander afloat

4. (U) PROGRAM TO COMPLETION: This is a continuing program

E. (U) WORK PERFORMED BY: IN HOUSE: NRL, Washington, D.C., NOSC, San Diego, Ca; CONTRACTOR: Harris Corp., Melbourne, Fl.

F. (U) RELATED ACTIVITIES: Shared Adaptive Internet Technology (SAINT)
Communications Shared Network Interface (CSNI) (NATO)

0604577N	NESP	0303109N	Satellite Communications
0603717N	C2 System	0204163N	Fleet Telecommunications
0205604N	TIS	0303401N	COMSEC
0603717N	NATO IMPROVED LINK 11 (NILE)		

CSS is the systems engineering effort which brings all these implementing programs into a single communications architecture.

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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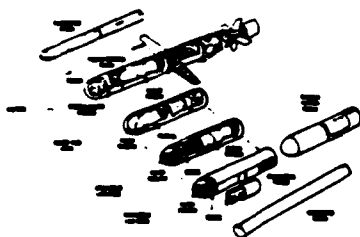
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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0204229N Budget Activity: 4
 Program Element Title: SURFACE COMBATANT ORDNANCE - TOMAHAWK
 Program Number: A0545 Project Title: TOMAHAWK

TOMAHAWK ALL-UP-ROUND



POPULAR NAME: TOMAHAWK CRUISE MISSILE

A. (U) SCHEDULE/BUDGET INFORMATION: (dollars in thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	To Complete	
Program	MS3	BLK 3	ADV TWCS	IOC BLK 3	CONTINUING
Milestones	TLAM/D (JAN)	MS 2A (JAN) MS 3 (JUN)	MS 2A (MAR)	SHIP (MAR) IOC SUB FLEX (SEP) ADV TWS MS 2A (JAN 93)	
Engineering	DES REV			DES REV	CONTINUING
Milestones	BLK 3			ADV TWS	
T&E	DT/OT	DT/OT			CONTINUING
Milestones	BLK III	BLK III			
Contract	FLEX	FLEX	FLEX		CONTINUING
Milestones	BLK 3 VLS INT ISNSA	BLK 3 ADV TWCS VLS INT. ISNSA	BLK 3 ADV TWS VLS INT. ISNSA		
BUDGET (\$K)	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL	
Major Contract	16,740	18,495	17,356	Continuing	
Support Contract	0	0	0	0	
In-House Support	16,558	9,739	8,094	Continuing	
GFE/Other	0	0	0	0	
Total	33,298	28,234	25,450	Continuing	

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0204229N Budget Activity: 4
Program Element Title: SURFACE COMBATANT ORDNANCE - TOMAHAWK
Program Number: A0545 Project Title: TOMAHAWK

B. (U) DESCRIPTION: The TOMAHAWK Cruise Missile provides an attack capability against targets at sea (TOMAHAWK Anti-Ship Missile) and on land (TOMAHAWK Land-Attack Missile). The Land-Attack missile can be fitted with either conventional unitary warhead (TLAM/C), nuclear warhead (TLAM/N) or submunition dispenser (TLAM/D).

The Tomahawk Development encompasses TLAM C/D Block III (BLK III) Upgrade and Advanced Tomahawk Weapons Systems (ADV TWS). The BLK III effort incorporates the Global Positioning System (GPS) capability; provides an insensitive warhead, extended range, Time of Arrival (TOA); and upgrades the Digital Scene Matching Area Correlator (DSMAC IIA) accuracy for low contrast matching. The ADV TWS shipboard system development provides Flex TLAM C Planning, GPS-only shipboard planning, automated Engagement Planning, and Over-the-Horizon Tomahawk capability. The ADV TWS development provides quick reaction route and strike planning, integrates Tomahawk joint strike capability, provides command information distribution, upgrades operational flight software, and explores potential target identification solutions.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Continued the development engineering of TLAM Block III (both variants TLAM/C and D) and operational testing including at-sea flight tests.
- b. (U) Continued development of Tomahawk Weapon Control System (TWCS) Block III, Vertical Launch System (VLS) integration, Submarine Flexible Targeting, Advance Systems Engineering, and Independent Software Nuclear Safety Analysis (ISNSA).

2. (U) FY 1992 PROGRAM:

- a. (U) Continue engineering development of TLAM Block III and operational testing leading to limited and full-rate production decisions; Flex Targeting (sub); Initiate Advance Tomahawk Weapons System (Adv TWS) development to provide automated Engagement Planning improved digital TLAM-N Flex Targeting; TLAM-C Flex; Over-the-Horizon (OTH) Tomahawk Capability encompassing improved communications, sensors, interfaces and database processes; software development automate/embed target, tactical and training algorithms; and Operational Flight Simulation (OFS)/TLAM upgrade development.
- b. (U) Development research efforts to identify sources of new target data.
- c. (U) Continue ISNSA, VLS integration.

3. (U) FY 1993 PLANS:

- a. (U) Complete development of TLAM Block III for ship and Flex Targeting for sub.
- b. (U) Continue engineering development Block III (sub), Adv TWS (Tomahawk Weapon System), ISNSA, VLS integration and Advanced Systems Engineering.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0204229N Budget Activity: 4
Program Element Title: SURFACE COMBATANT ORDNANCE - TOMAHAWK
Program Number: A0545 Project Title: TOMAHAWK

D. (U) WORK PERFORMED BY: IN-HOUSE: NWC, China Lake, CA; NUSC, Newport, RI; NADC, Warminster, PA; NAVSWC, Dahlgren, VA; PMTC, Ft. Mugu, CA; NOSC, San Diego, CA; JHU/APL, Laurel, MD; NAC, Indianapolis, IN; NAVSHIPWPNSYSENGSTA, Port Hueneme, CA.
Contractors: McDonnell Douglas Missiles System Company, St. Louis, MO; General Dynamics/Convair, San Diego, CA; Logicon, San Pedro, CA; Lockheed Missiles & Space Company, Austin, TX.

E. (U) COMPARISON WITH THE FY 1992/1993 PRESIDENT'S BUDGET:
1. (U) TECHNICAL CHANGES: None.
2. (U) SCHEDULE CHANGES: None.
3. (U) COST CHANGES: None.

F. (U) PROGRAM DOCUMENTATION:

	TOR	DOP	OR	NDCE	TEMP
TOMAHAWK Missile (All-up Round)	N/A	N/A	N/A	12/90	3/91
TOMAHAWK Launch platforms	N/A	N/A	N/A	12/90	3/91
TOMAHAWK Missile Block III			11/87	12/90	8/90

G. (U) RELATED ACTIVITIES:

PE 0604367N (Tomahawk - Theater Mission Planning Center)
PE 0604707N (Theater Mission Plan Center)
PE 0604370N (SSN 688 Vertical Launch)

H. (U) OTHER APPROPRIATION FUNDS: (Dollar in Thousands)

	FY 1991 Actual	FY 1992 Estimate	FY 1993 Estimate	To Complete	Total Program
APPN/P-1					
WPN/#5	1,045,943	411,187	404,194	Cont.	Cont.
OPN/#182	21,500	52,932	47,784	Cont.	Cont.
OPN/#183	2,339	3,293	3,645	Cont.	Cont.
MILCON	11,229	10,580	0		

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: See FY 1993 Congressional Data Sheets.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204311N BUDGET ACTIVITY: 4
 PROGRAM ELEMENT TITLE: Undersea Surveillance Systems
 PROJECT NUMBER: X0766 PROJECT TITLE: Integrated Undersea Surveillance
 System (IUSS) Development

POPULAR NAME: IUSS

A. (c) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program Milestones				

MSIIIA LFA 3/93 MSII 4Q/96 SDS

Engineering Milestones

	SRP SDS 2Q92	CDR SOSUS Modernization
	PDR LFA ARS 12/91	4QFY95
PDR LFA LTS 02/91	SDR SDS 3Q/92	CDR SDS 1Q/94
CDR LFA LTS 05/91	SRP SDS 1Q/93	
SDR LFA ARS 6/91	ESP DEMO 3/93	

T&E Milestones

LFA Sea Test 6 11/90		DT II/OT II SOSUS
LFA Sea Test 7 7/91		Modernization 2Q/97
LFA LTS Endurance	LTS Mini-System	DT/OT IIB LFA 3Q/95
Test 7/91	LFA 11/91	

Contract Milestones

Award LFA LTS 10/90	Award PSP/SOSUS	SOSUS Modernization
	Modernization	Design 1Q/95
Award SDS Design 4Q/91	1/92	SDS P&ED CONT 4Q/96
	Exercise SDS	
	Devel Option	
	3Q/93	

BUDGET (\$000)	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
Major				
Contract	43,346	62,618	58,762	Cont.
Support				
Contract	3,321	4,419	4,702	Cont.
In-House				
Support	3,496	6,390	7,590	Cont.
GFE/				
Other	276	211	215	Cont.
Total	50,439	73,638	71,269	Cont.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204311N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Undersea Surveillance Systems
PROJECT NUMBER: X0766 PROJECT TITLE: Integrated Undersea Surveillance
System (IUSS) Development

B. (u) DESCRIPTION: IUSS provides the Navy its primary means of detection of threat submarines, With the end of the Cold War, the program is undergoing a major

This program provides for a smaller, consolidated SOSUS system, while maintaining its operational effectiveness; the intra-system acoustic and data handling/transmission systems; and the development and deployment of a SURTASS Reduced Diameter Array (RDA) tasks, (RDA transferred to Program Element 0204313N in FY92).

(u) Primary Mission: To be able to provide ASW coverage in any area of the world on an

(u) SURTASS and LFA will provide that mobile coverage in deep water. The SURTASS/LFA program will provide an capability for IUSS passive sensors, of the 1990s and beyond. The program is developing for the SURTASS TAGOS (Small Waterplane Area Twin Hulled - Active (SWATH-A)) platforms, and will also provide for

SURTASS/LFA program components are: (1) TAGOS 23 class SWATH platform; (2) low frequency high power source array; (3) receive processing subsystem to perform detection, classification and reporting aboard the SWATH ship; and (4) reduced diameter SURTASS receive array.

(u) SOSUS will be consolidating and shutting down sites, while preserving most of its current operational effectiveness. Consolidation and integration of shore processing will require a much smaller military workforce. Modernization replaces existing paper writer displays with CRT workstations. This is a very cost effective requirement to allow site consolidations for long-term operating cost savings and for incorporation of

Subsequent

to further reduce manpower requirements.

(u) The requirements to

can be best achieved through the creation of a federated network of Surveillance Direction System (SDS) centers for ocean basins. This will provide both a high reliability and mobile tactical communications system with interoperability with shore forces. The following capabilities will be incorporated:

throughput rates consistent with a concept of environment. SDS will be fully integrated within the Navy's Space Electronics Warfare Architecture, Copernicus.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204311N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Undersea Surveillance Systems
PROJECT NUMBER: X0766 PROJECT TITLE: Integrated Undersea Surveillance System (IUSS) Development

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Developed SOSUS signal processing

conversion of displays to CRT workstations.

and

design to provide capability for cable ships to install fiber optic cables. ^{Designed} ^{Began equipment}

b. (U) Began SDS design; commenced design of SDS interface required for IUSS data transfer, fusion and display to support ASW command, control and communications.

c. (U) Commenced LFA full scale engineering development (FSED) Low Frequency Transmit Subsystem. Conducted LFA 6 and 7 sea tests with emphasis on

2. (U) FY 1992 PROGRAM:

- a. (U) Deploy and test detection of
at two evaluation sites; initiate work in automatic
Complete

Complete design and test cable ship mission equipment.

b. (U) Continue SDS design; Conduct System Requirements Review (SRR) second quarter; conduct System Design Review (SDR) third quarter.

c. (U) Conduct LFA Preliminary and Critical Design Reviews; continue LFA FSED; deliver and install Engineering Development Model (EDM) LFA Transmit and RDA subsystem on board the R/V Cory Chouest.

3. (U) FY 1993 PLANS:

- a. (U) Develop specifications for a processing architecture to support real time automatic

Incorporate

and improve the automatic classification by combining information from both ^{Refine}
equipment for new cable ships. Design replacement data storage subsystem. ^{Design cable handling mission}

b. (U) Continue SDS design; conduct System Specification Review (SSR) first quarter; conduct Preliminary Design Review (PDR).

- c. (U) Continue LFA FSED; complete Milestone III-A LFA.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: In-House: NOSC, San Diego, CA; NCEL, Port Heuneme, CA; NRL, Wash DC; NESEA, St. Inigoes, MD; Contractors: Hughes Aircraft Co., Buena Park, CA; APL/JHU, Laurel, MD; AT&T Technologies Inc., Greensboro, NC; ARL Univ of Texas, Austin, Texas; Lockheed Sanders Inc., Manchester, NH; IBM, Manassas, VA; AT&T Bell Laboratories, Whippany, NJ; TRW, McLean, VA.

E. (U) COMPARISON WITH FY 1992/93 PRESIDENT'S BUDGET:

- 1. (U) TECHNICAL CHANGES: Not Applicable.

- 2. (U) SCHEDULE CHANGES: Not Applicable.

3. (U) COST CHANGES: A reduction of \$1.9M in FY93 will delay the full implementation of SDS by three months.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204311N BUDGET ACTIVITY: 4
 PROGRAM ELEMENT TITLE: Undersea Surveillance Systems
 PROJECT NUMBER: X0766 PROJECT TITLE: Integrated Undersea Surveillance
 System (IUSS) Development

F. (U) PROGRAM DOCUMENTATION:

NDCP #78 (SOSUS)	28 Jan 1980
AP 89-22 (SOSUS)	7 Aug 1989
OR 246-02-89 (SDS)	5 Jun 1989
AP 89-1 (SDS)	25 May 1990
AP Update 89-1 (SDS)	23 Dec 1991
OR 038-95-88 (LFA)	5 Jul 1985
TEMP 1214 (LFA)	7 Nov 1989
DCP T-AGOS-23 SWATH A	22 Aug 1989
DCP 137 Rev 1 - SURTASS Improvements (incl LFA)	20 Feb 1990
AP 91-06 (SURTASS/LFA)	28 Aug 1991

G. (U) RELATED ACTIVITIES: PE 0604784N, Fixed Distributed System (FDS);
 PE 0204313N, Surveillance Towed Array Sensor (SURTASS) System; PE 0603747N,
 Advanced ASW Technology Demonstration; PE 0604507N, Enhanced Modular Signal
 Processor (EMSP); PE 0602702E, Automated Surveillance Information Processing
 System.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL
(U) PROCUREMENT					
SCN #20	0	148,509	0	Cont.	Cont.
OPN #60	39,543	77,707	87,033	Cont.	Cont.
OPN #64	5,107	27,683	30,187	Cont.	Cont.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: LFA sea tests demonstrated

position info provided
 detections by tactical ships. FY92 operational test in MED
 demonstrated successfully used
 tactical units; developed tactics
 for coordinated fleet operations. FY93 sea test will demonstrate operational
 effectiveness of all major components of LFA production system.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204313N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Towed Array Surveillance Systems
PROJECT NUMBER: X0758 PROJECT TITLE: SURTASS

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 TO ESTIMATE COMPLETE	TOTAL PROGRAM
X0758	SURTASS	5,774	23,868	21,381 Cont.	Cont.

B. (U) DESCRIPTION: The Surveillance Towed Array Sensor System (SURTASS) the mobile, tactical arm of the Navy's undersea surveillance capability that provides

against both In response to the economic and threat challenges of today's environment, the SURTASS program is moving towards a significant reduction in fleet ships; consolidation of logistics support; use of Non-Developmental Items (NDI) and commercial hardware for signal processing; and focused development efforts to use new technology to increase operator efficiency and incorporate low frequency active sonar capability for The SURTASS Block Upgrade and Reduced Diameter Array (RDA) provide improved capability to SURTASS to counter quieter threats, including projected in the 1990s (transferred from Program Element 0204311N in FY 92).

It also provides for the conversion of a commercial ship to add an active capability for fleet evaluation and tactics development. Additional upgrades will provide for a capability to multiply the effectiveness of the T-AGOS 19 (SWATH-P) class; Integrated SURTASS active and passive operations; improved shipboard

communications bandwidth; training and testing operators under realistic operational scenarios to ensure operator proficiency in the changing threat environment; the integration of SURTASS with emergent Integrated Undersea Surveillance System (IUSS) sensors; and the required conversion from Enhanced Modular Signal Processor (EMSP) SEM B to SEM E.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:
 - a. (U) Completed 85% of Block Upgrade software development.
2. (U) FY 1992 PROGRAM:
 - a. (U) Complete Block Upgrade software code and testing; conduct formal Government acceptance testing.
 - b. (U) Begin integration of Low Frequency Active (LFA) into SURTASS.
 - c. (U) Begin development of Low Frequency Active (LFA) capability, Operational Readiness Inspection (ORI) Upgrade to provide an interactive target scenario generator, and Full Spectrum Processing (FSP) Upgrade to provide enhanced

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204313N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Towed Array Surveillance System
PROJECT NUMBER: X0758 PROJECT TITLE: SURTASS

- d. (U) Begin software conversion from EMSP SEM B to EMSP SEM E.
- e. (U) Begin ship conversion.
- f. (U) Deliver RDA EDM and conduct array subsystem tests.
- 3. (U) FY 1993 PLANS:
 - a. (U) Conduct TECHEVAL and OPEVAL on SURTASS Block Upgrade and Reduced Diameter Array.
 - b. (U) Achieve Milestone III for SURTASS Block Upgrade (including the Reduced Diameter Array) on T-AGOS 20.
 - c. (U) Continue development of LFA capability, ORI Upgrade, PSP Upgrade, LFA integration, and EMSP SEM B to SEM E conversion.
 - d. (U) Begin concept definition phase of an Enhanced Shipboard Capability to provide more effective SURTASS Battle Group support.
- 4. (U) Program to completion:
 - a. (U) Complete development of ORI Upgrade.
 - b. (U) Complete conversion of software from EMSP SEM B to EMSP SEM E.
 - c. (U) Complete development of LFA capability, PSP Upgrade, and Enhanced Shipboard Capability Upgrade.
 - d. (U) Begin requirements definition and complete development for integration of SURTASS into Surveillance Direction Systems (SDS), an Information Processing Systems Upgrade to improve detection capability, and a Reduced Diameter Array (RDA) Upgrade to improve array performance by incorporating fiber optic technology.
 - e. (U) Initiate and complete other upgrades as required to ensure continued SURTASS effectiveness in the threat environment of the year 2000.
- D. (U) WORK PERFORMED BY: In-House: NOSC, San Diego, CA.; Contractors: Hughes Aircraft Company, Fullerton, CA; AT&T Federal Systems & Advanced Technology, Greensboro, NC.
- E. (U) COMPARISON WITH FY 1992/93 PRESIDENT'S BUDGET
 - 1. (U) TECHNOLOGY CHANGES: Not Applicable.
 - 2. (U) SCHEDULE CHANGES: Hardware and software problems with the Enhanced Modular Signal Processor (EMSP) delayed the development of Block Upgrade signal processor application software by twelve months, delaying program IOC by nine months.
 - 3. (U) COST CHANGES: FY 1993 has increased by \$6.2M to fund non-recurring costs to modify EMSP hardware and software to be compatible with SURTASS.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204313N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ship Towed Array Surveillance System
PROJECT NUMBER: X0758 PROJECT TITLE: SURTASS

F. (U) PROGRAM DOCUMENTATION:

DCP 137	02/20/1990
TEMP 164-1 (REV 1) (SURTASS BLOCK UPGRADE)	EST 01/92
TEMP 1214 (REV 1) (LFA)	EST 03/93
AP 91-06 (SURTASS)	08/28/1991

G. (U) RELATED ACTIVITIES: PE 0204311N, Undersea Surveillance System - Provides the Reduced Diameter Array (RDA) portion of the SURTASS Block Upgrade in FY 90 and 91, Low Frequency Active (LFA) development, and Surveillance Direction Systems (SDS) development; PE 0603785N, ASW Environmental Acoustic Support (AEAS) - provides acoustic data and modelling support and testing of modified arrays; PE 0604507N, Enhanced Modular Signal Processor (EMSP) - develops signal processor for Block Upgrade.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT					
SCN #20	0	148,509	0	CONT.	CONT.
OPN #64	5,107	27,683	30,187	CONT.	CONT.
MILCON	22,531	2,650	26,478		

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE:

Block Upgrade TECHEVAL/OPEVAL	FY 1993
Block Upgrade IOC	
Block Upgrade MS III	FY 1993
Operational Readiness Upgrade	
EMSP SEM B to SEM E Conversion Upgrade	FY 1995

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FY 1993 RDT&E NAVY DESCRIPTION SUMMARY

PROGRAM ELEMENT: 0204413N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Amphibious Tactical Support Units (Displacement Craft)
PROJECT NUMBER: S1980 PROJECT TITLE: Amphibious Over-the-Horizon
(OTH) Command and Control

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1980	ACTHC2	4,078	3,344	3,551	3,093	14,066

B. (U) DESCRIPTION: This project integrates existing developments into a system which will support the command and control of surface amphibious assaults launched from extended over-the-horizon (OTH) off-shore ranges. The system adapts the USMC's Position Location Reporting System (PLRS) for naval applications and integrates it with shipboard navigation and communications systems. The project is required to identify, track, communicate with, and control landing craft from launch through transit, offload, and return.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:
 - a. (U) Developed SINGARS airborne relay pallet and Global Positioning System Interface Unit (GPSIU) advanced development models and conducted tests to establish baseline for concept validation.
 - b. (U) Conducted successful concept validation of PLRS/GPS integration via GPSIU that demonstrated a dynamic baseline capability.
 - c. (U) Completed Management Plan, Acquisition Plan, Integrated Logistics support Plan (ILSP) and updated draft Test Evaluation Master Plan (TEMP).
2. (U) FY 1992 Program:
 - a. (U) Conduct System Design Review (SDR).
 - b. (U) Conduct Preliminary Design Review (PDR) for subsystems.
 - c. (U) Perform Hardware Integration and Testing.
3. (U) FY 1993 Plans:
 - a. (U) Perform System Integration and Testing.
 - b. (U) Install System for Development Testing.
 - c. (U) Conduct DT-IIA (Techeval) Basic System Testing.
4. (U) Program to Completion:
 - a. (U) Install Software Increment II and III.
 - b. (U) Complete Developmental Testing and support Operational Testing.

D. (U) WORK PERFORMED BY: IN-HOUSE: NADC, Warminster, PA; NCSC, Panama City, FL; MCTSSA, Camp Pendleton, CA; NAC, Indianapolis, IN; NOC, San Diego, CA; NAVELEX, Vallejo, CA. CONTRACTORS: None

E. (U) RELATED ACTIVITIES:

- PE 0206626M MC C³ System (Position Locating and Reporting System)
- PE 0603260M Airborne Mine Countermeasure (Global Positioning System)
- PE 0204163M Fleet Telecommunications (TAC) (Single Channel Ground and Airborne Radio System (SINGARS))

F. (U) OTHER APPROPRIATION FUNDS: Procurement funds in the out years.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204571N
PROGRAM ELEMENT TITLE: Special Projects

BUDGET ACTIVITY: 4

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0431 Tactical Aircrew Combat Training System (TACTS)	3,419	8,350	8,927	Cont.	Cont.
X1823 Enhancement Naval Warfare Gaming System (ENWGS)	2,152	2,208	2,185	-0-	26,950
W1998 Tactical Combat Training System (TCTS)	-0-	3,620	9,947	Cont.	Cont.
TOTAL	5,571	14,178	21,059	Cont.	Cont.

B. (U) DESCRIPTION: This program develops instrumentation systems to support fleet training and tactics assessment. Specifically, it develops the Tactical Aircrew Combat Training System (TACTS), the Tactical Combat Training System (TCTS), and the Enhanced Naval Warfare Gaming System (ENWGS). The TACTS provides real-time monitoring and post-exercise debrief of aircrews flying on instrumented training ranges. Through its use of computer simulations, it provides aircrew training in weapons and countermeasures employment and tactics development in multiple warfare areas including air-to-air, air-to-surface, power projection, and defense suppression. This system is a primary training tool used by the Navy's "Top Gun" Fighter Weapons School and its attack counterpart, the Naval Strike Warfare Center, as well as the Marine's Weapons and Tactics Instructors course. TCTS will develop fleet deployable instrumentation for at sea surface, subsurface, and air training and tactics development. TCTS will accommodate single unit, as well as large area battle group training evolutions. It will provide real-time, accurate feedback for tactics assessment and force employment. The system will generate Electronic Warfare (EW) and weapons simulation/stimulation and paired engagement scoring. It will support simultaneous simulated and actual battle group/aggressor units and simulated or live fire interactions. It will include large screen debriefing displays. The program also includes development of near term upgrade to the capabilities of the Mobile Sea Range (MSR) during FY-93 to FY-95. The MSR development provides enhancement for fleet training exercises and is not directly connected to TCTS. ENWGS is a distributed tactical training system located at Tactical Training Group Atlantic, Tactical Training Group Pacific, Naval War College, Commander-In-Chief Pacific Fleet, Navy Post Graduate School, Commander-In-Chief U.S. Navy Europe, Naval Amphibious School (NAVPHIBSCOL), Little Creek VA and Corona, CA. The ENWGS provides predeployment Battle Group-level training for senior Naval Officers and their staffs, supports the Tactical Warfare Training Curriculum at the Tactical Training Groups and supports the amphibious warfare Tactical Training Curriculum at the NAVPHIBSCOL's. This system optimizes Battle Group/Battle Force training and supports Fleet training objectives independent of Force Structure. These capabilities are not available in any other system.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204571N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Special Projects

PROJECT NUMBER: W0431 PROJECT TITLE: Tactical Aircrew Combat Training System (TACTS)

C. (U) DESCRIPTION: This project develops new TACTS capabilities primarily through the integration of additional weapons and aircraft types. This requires development of new aircraft interfaces, weapons and countermeasures simulations, and modifications to displays. Software is also developed to produce computer generated Electronic Warfare (EW) threats to enhance the system's ability to provide training in a realistic EW environment. Various other system performance improvements are also developed to make the system more effective and reliable.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Continued development of capabilities for additional aircraft and weapons, improved threat environment, and system reliability.

b. (U) Obtained approval for full rate production of the Airborne Instrumentation Subsystem Internal for F/A-18.

2. (U) FY 1992 PROGRAM:

a. (U) Complete the upgrade of the Control and Computation Subsystem, continue integration of the Orange Command and Control system and integration of new weapons.

b. (U) Continue development of pod encryption and new training capabilities for more weapons and aircraft types (e.g., AV-8B). Continue joint project with the Air Force for the next upgrade of TACTS, the Joint Aircrew Combat Training System (JACTS).

3. (U) FY 1993 PLANS:

a. (U) Continue to develop TACTS software to provide training capabilities for Phoenix, Advanced Medium Range Air to Air Missile, High speed Anti-Radiation Missile, Hellfire missile, and airborne countermeasures and other weapons.

b. (U) Enhance simulated threat environment including the effects of barrage fired Anti-Aircraft Artillery. Continue JACTS development and other system improvements.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: PMTC, Point Mugu, CA; NWC, China Lake, CA; NATC, Patuxent River, MD; NADC, Warminster, PA; NWAC, Corona, CA.

CONTRACTORS: Cubic Defense Systems, San Diego, CA; Loral, Sunnyvale, CA; FAAC, Ann Arbor, MI.

F. (U) RELATED ACTIVITIES: TACTS is a dual service program with the USAF, as defined by memorandum of agreement. Development of capabilities of common interest are jointly funded (P.E. 0203313F) under the management of a lead service. The lead service is agreed to on a project by project basis.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT:					
APN/P-1 #61	\$6,837	\$ 9,722	\$14,769	Cont.	Cont.
OPN/P-1 #162	\$7,135	\$10,393	\$14,651	Cont.	Cont.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204571N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Special Projects
PROJECT NUMBER: X1823 **PROJECT TITLE:** Enhanced Naval Warfare
Gaming System (ENWGS)

C. (U) DESCRIPTION: ENWGS is the only Navy-recognized naval warfare gaming system. ENWGS supports wargaming for CINCLANTFLT, CINCPACFLT, Commander-In-Chief U.S. Navy Europe, Fleet Commanders, Battle Group Commanders, the Naval War College, Joint Warfare Center and tactical training courses conducted at the Tactical Training Groups (Atlantic and Pacific) and the Naval Amphibious Schools. ENWGS is a critical portion of the training Battle Group Commanders and their supporting Warfare Commanders receive prior to deployment. Through simulation, ENWGS assists tactical commanders in planning, executing, and evaluating Fleet operations and exercises. ENWGS tests the Battle Groups' Operation Orders and directives, providing the essential supplement to at-sea operations prior to going to sea. ENWGS is an exceptionally cost effective alternative to at-sea operations. ENWGS will be re-written in the Department of Defense standard language, Ada, during FY 91-93 to allow rehosting from obsolete, unsupportable mainframe computers to Navy standard hardware and architecture in FY 94.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) **FY 1991 ACCOMPLISHMENTS:**
 - a. (U) Completed delivery of Release 3.0 to Government.
 - b. (U) Commenced ENWGS software (Ada) Release 4.0 development.
2. (U) **FY 1992 PROGRAM:** Continue development of ENWGS software (Ada) Release 4.0.
3. (U) **FY 1993 PLANS:**
 - a. (U) Complete development of ENWGS software (Ada) Release 4.0.
 - b. (U) Deliver Release 4.0 to Government.
 - c. (U) Commence and complete test and evaluation of software.
 - d. (U) R&D task completes in FY 1993.
4. (U) **PROGRAM TO COMPLETION:** Not Applicable.

E. (U) WORK PERFORMED BY: IN-HOUSE: Naval Electronics Activity, Portsmouth, VA; **CONTRACTOR:** Computer Sciences Corporation, Moorestown, N.J.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

UNCLASSIFIED

FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0204571N BUDGET ACTIVITY: 4
 PROGRAM ELEMENT TITLE: Special Projects
 PROJECT NUMBER: W1998 PROJECT TITLE: Tactical Combat Training
 System (TCTS)

C. (U) DESCRIPTION: TCTS will develop and procure deployable instrumentation designed to provide and evaluate Naval Combat Training at-sea for single platform, multi-platform (surface ship, submarine, aircraft) and Battle Group multi-warfare training. To accomplish this, TCTS instrumentation will be designed to develop and transmit exercise scenarios; simulate/stimulate all exercise participant sensors/weapons with the exercise scenario; track all exercise participants and events; e.g., weapons engagements; and, provide accurate, realistic, and timely exercise feedback. TCTS will build on the capabilities developed for the in-port Battle Force Tactical Training program and take those capabilities to sea for follow-on, more advanced training, and incorporate the DARPA produced protocol data unit for multi-service training communications with shore based simulators and trainers. The program includes development of near-term upgrades to the capabilities of the Mobile Sea Range (MSR) so that it can better support fleet at-sea training during FY 1993 to FY 1995.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Not Applicable
2. (U) FY 1992 PROGRAM:
 - a. (U) Release Request for Proposal (RFP) for preliminary design competition.
 - b. (U) Evaluate proposals and downselect to three contractors.
 - c. (U) Prepare for Milestone (MS) I decision.
3. (U) FY 1993 PLANS:
 - a. (U) Award three design contracts.
 - b. (U) Initiate MSR upgrades for ship and aircraft weapon system interface development and associated AAM/ASUW display and debriefing capability.
 - c. (U) Prepare for MS II decision.
4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN HOUSE: PMTC, Ft. Mugu, CA; NWC, China Lake, CA; NTSC, Orlando, FL; NUSC, Newport, RI; NOSC, San Diego, CA; NATC, Patuxent River, MD; NADC, Warminster, PA, NWAC, Corona CA. CONTRACTORS: SRI, Menlo Park, CA; Galaxy Scientific, Inc., West Berlin, NJ; Frontier Engineering, Inc., Stillwater, OK.

F. (U) RELATED ACTIVITIES: Program Element 0204571N, Special Projects, Project W0431, Tactical Aircrew Combat Training System (TACTS). Program Element 0604208N, Range Instrumentation and Systems Development.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT: *					
APN/P-1 #63	-0-	2,300	1,300	3,600	3,600
OPN/P-1 #162	-0-	200	4,025	182,800	190,500

* FY 1992/3 procurement is for MSR upgrades developed in prior years.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205604N

PROGRAM ELEMENT TITLE: Tactical Information System

BUDGET ACTIVITY: 4

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X1977	JTIDS	77,896	62,650	43,819	9,057	543,756
X2126	MIDS	0	10,220	14,411	Cont.	Cont.
	TOTAL	77,896	72,870	58,230	Cont.	Cont.

B. (U) DESCRIPTION: This program element develops Link 16 which is an integration of the Joint Tactical Information Distribution System (JTIDS) and the Tactical Digital Information Link J (TADIL J).

(U) JTIDS will provide selected U.S. Navy tactical aircraft, U.S. Navy ships, and U.S. Marine Corps ground units with crypto-secure, jam resistant, low-probability-of-exploitation communication of tactical data and voice at a high data rate. It will have additional capabilities of common grid navigation and automatic relay inherent in the equipment that will enable long range communication and provide jam resistance. The system will be interoperable among all Services and NATO/Allied users equipped with JTIDS or the NATO MIDS System.

(U) Multifunctional Information Distribution System (MIDS) is a Pre-planned Product Improvement (P3I) of JTIDS. The goal of the MIDS program is to produce a terminal that is smaller, lighter, and fully compatible with and as capable as the JTIDS Class 2 terminal. The MIDS terminal will be suitable for use in platforms that cannot accommodate the larger, heavier JTIDS terminal. The first U.S. Navy planned application of a MIDS terminal is the F/A-18. This project will fund the costs to integrate and test MIDS in the F/A-18. Terminal development costs are funded in program element 0604771D.

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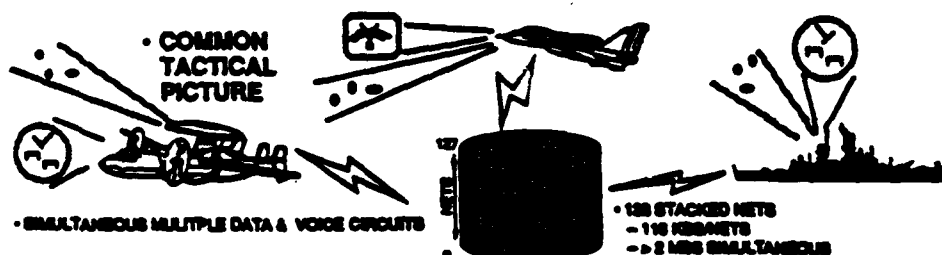
FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205604N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Tactical Information System

PROJECT NUMBER: X1977 PROJECT TITLE: Joint Tactical Information Distribution System (JTIDS)



POPULAR NAME: Link-16 - Joint Tactical Information Distribution System (JTIDS)

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	To Complete
				NPDM IIIC 3QTR/94 IOC 2QTR/94
Program Milestones	NPDM IIIA	NPDM IIIB		
Engineering Milestones	Complete F-14D Integ.	Complete E-2C Integ. Networks	Deliver Operational Fixes	
T&E Milestones	DT-IID DT-IIE OT-III	DT-IIE DT-IIA DT-IIC-2 OT-IIE OT-IIC	TECHEVAL	OPEVAL 1QTR/94
Contract Milestones	N/A	N/A	N/A	N/A
BUDGET (\$000)	FY 1991	FY 1992	FY 1993	Program Total (To Complete)
Major Contract	42,357	37,513	26,884	315,089 (4,046)
Support Contract	1,007	904	514	6,191 (0)
In-House Support	11,869	8,183	7,032	82,140 (3,686)
CPE/ Other	22,663	16,050	9,389	140,336 (1,325)
Total	77,896	62,650	43,819	543,756 (9,057)

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205604N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Tactical Information System

PROJECT NUMBER: X1977 PROJECT TITLE: Joint Tactical Information Distribution System (JTIDS)

B. (U) DESCRIPTION: Combat experience gained during the Southeast Asia conflict, Middle East incidents, Grenada, and Desert Storm exposed several deficiencies in United States tactical communication, navigation, and identification systems. Extensive analyses of these combat situations indicate that a joint service, high capacity, secure and jam resistant communication and data link would increase force effectiveness and substantially reduce losses due to hostile action and friend-on-friend engagements. These capabilities are critical in the high speed, long range, and electronically hostile environment envisioned in any substantial modern-day conflict. Due to the proliferation of high-technology weaponry, this includes any engagement with potential enemies.

(U) Link 16 is an integration of the Time Division Multiple Access (TDMA) family of Joint Tactical Information Distribution System (JTIDS) terminals and the Tactical Digital Information Link J (TADIL J) Message Standard. It will provide selected U.S. Navy tactical air, U.S. Navy ships and Marine Corps ground units crypto-secure, jam resistant, low-probability-of-exploitation communication of tactical data and voice at a high data rate. It will have the additional capabilities of common-grid navigation and the use of automatic relay inherent in the equipment that will enable long-range communication and provide jam resistance. The system will be interoperable among all Services and NATO/Allied users equipped with JTIDS or the European version, NATO Multifunctional Information Distribution System (MIDS) (Germany, Italy, France, and Spain). This project will fund the costs to integrate and test JTIDS in the E-2C, F-14D, CV, CG, and DDG.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:

- a. (U) Conducted DT-IID/DT-II E(2).
- b. (U) Conducted OT-IIA.
- c. (U) Completed F-14D integration.
- d. (U) Continued E-2C and ship integration.
- e. (U) Continued multi-platform and joint service testing.
- f. (U) Continued joint service Automatic Network Management Aid development.
- g. (U) Continued MIDS F/A-18 integration design study
- h. (U) Continued downsizing of High Speed Anti-Radiation Missile Command Launch Computer (HARM CLC) in F/A-18.

2. (U) FY 1992 Program:

- a. (U) Complete E-2C integration.
- b. (U) Continue ship integration.
- c. (U) Conduct DT-IIA, DT-IIC-2, DT-IIE, OT-IIB, and OT-IIC.
- d. (U) Continue multi-platform and joint service testing.
- e. (U) Continue joint service Automatic Network Management Aid Development.
- f. (U) Deliver PSED terminals for continuing developmental/operational testing.

3. (U) FY 1993 Plans:

- a. (U) Complete ship integration.
- b. (U) Continue multi-platform and joint service testing.
- c. (U) Continue joint service Automatic Network Management Aid development.
- d. (U) Conduct TECHEVAL.
- e. (U) Deliver Navy unique and joint service operational networks.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205604N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Tactical Information System

PROJECT NUMBER: X1977 PROJECT TITLE: Joint Tactical Information Distribution System (JTIDS)

4. (U) Program to Completion:
 - a. (U) Complete joint service Network Development Aid (Version 1).
 - b. (U) Conduct OPEVAL.
 - c. (U) Conduct follow-on E-2C, F-14D, and ship integration, multi-platform, and joint service testing of fixes to operational testing deficiencies.
 - d. (U) Achieve Interim Operational Capability (IOC).
- D. (U) WORK PERFORMED BY: IN-HOUSE:NAVOCEANSYSCEM, San Diego, CA; NAVAIRTESTCEN, Patuxent River, MD; FLTCOMBATDIRSSACT, San Diego, CA; FLTCOMBATDIRSSACT, Dam Neck, Virginia Beach, VA; NAVAIRDEVCEM, Warminster, PA; NAVALEXCEM, Vallejo, CA. CONTRACTORS: GEC-Marconi Electronics System Co., Wayne, NJ; Collins Avionics and Communications Division of Rockwell International, Cedar Rapids, IA; Grumman Aerospace Corp., Bethpage, Long Island, NY; The Boeing Corporation, Seattle, WA.
- E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:
 1. (U) Technology Changes: Not Applicable.
 2. (U) Schedule Changes: JTIDS TCHEVAL/OPEVAL rescheduled to coincide with USS VINSON Battle Group work-up schedule.
 3. (U) Cost Changes: Not Applicable.
- F. (U) PROGRAM DOCUMENTATION:
 1. (U) MJCS 194-89 (MROC for JTIDS), 11/89
 2. (U) Joint JTIDS Navy TEMP Annex, 5/89
 3. (U) Acquisition Decision Memorandum (ADM) (JTIDS Milestone IIIA), 10/89
 4. (U) ADM (NPDM Milestone IIIA), 4/91
- G. (U) RELATED ACTIVITIES:
 - (U) Program Element 0603717N, Command and Control (C²) Systems (Adv).
 - (U) Program Element 0205667N, F-14 Upgrade.
 - (U) Program Element 0204152N, E-2 Squadrons.
 - (U) Program Element 0604771D, Common JTIDS.
- H. (U) OTHER APPROPRIATION FUNDS: (Quantity/Dollars in thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT					
APN (BA1)	16/	20/	0/	1/	37/
Various P-1s	16,084	18,408	903	6,629	42,024
APN (BA5)	19/	8/	11/	Cont.	Cont.
Various P-1s	17,885	9,823	21,876		
APN (BA6) #58	12,144	8,732	5,631	5,815	32,322
OPN (BA2) #83	8/	10/	9/	Cont.	Cont.
	23,506	28,931	28,674		
SCN	0/	5/	5/	Cont.	Cont.
	0	14,063	14,379		

- I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.
- J. (U) TEST AND EVALUATION DATA:
 - FY 91 - DT-IID/OT-IIA test results confirmed the Navy decision to continue development. DT-IIE test results are not completed.
 - FY92 - T&E milestones (noted on pg 1) are test phases required to support the NPDM IIIB (6/92).

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

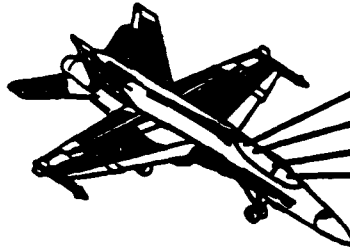
PROGRAM ELEMENT: 0205604N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Tactical Information System

PROJECT NUMBER: X2126 PROJECT TITLE: Multifunctional Information Distribution System (MIDS)

AVIONICS BAY 3R:
MIDS TERMINAL
DOWNSIZED HARM CLC



MODIFICATIONS TO:

INTERCOM SET

DIGITAL DISPLAY INDICATORS

HEAD-UP DISPLAY

DATA STORAGE UNIT

POPULAR NAME: Link 16 Multifunctional Information Distribution System (MIDS)

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	To Complete
Program Milestones		DAB II		Cont.
Engineering Milestones				Cont.
T&E Milestones				Cont.
Contract Milestones			F/A-18 Integ Award	Cont.

BUDGET (\$000)	FY 1991	FY 1992	FY 1993	To Complete
Major Contract		8,850	10,352	Cont.
Support Contract		410	278	Cont.
In-House Support		710	800	Cont.
GFE/Other		250	2,981	Cont.
Total	0	10,220	14,411	Cont.

FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205604N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Tactical Information System

PROJECT NUMBER: X2126 PROJECT TITLE: Multifunctional Information Distribution System (MIDS)

B. (U) DESCRIPTION: The Multifunctional Information Distribution System (MIDS) is a multinational (U.S., France, Germany, Italy, and Spain) cooperative development program established to design, develop, and deliver low-volume (LV), lightweight tactical information system terminals for U.S. fighter aircraft as well as foreign fighter aircraft, helicopters, ships and ground sites. The terminals will be designed as a Pre-Planned Product Improvement (P3I) of the JTIDS Time Division Multiple Access (TDMA) Class 2 terminals. The goal of the MIDS program is to produce a terminal that is smaller, lighter, fully compatible with, and as capable as the JTIDS TDMA Class 2 terminals but suitable for use on platforms that cannot accommodate the bulkier, heavier JTIDS TDMA Class 2 terminals. The first U.S. Navy planned application of a MIDS terminal is on the F/A-18. This program element will fund the costs to integrate and test MIDS on the F/A-18. Terminal development costs are funded in program element 0604771D.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments: N/A (Funded under P.E. 0205604N, Project X1977).
2. (U) FY 1992 Program:
 - a. (U) Continue MIDS F/A-18 integration design study.
 - b. (U) Continue downsizing of the High Speed Anti-Radiation Missile Command Launch Computer (HARM CLC) in the F/A-18.
3. (U) FY 1993 Plans:
 - a. (U) Complete MIDS F/A-18 integration design study.
 - b. (U) Award contract for MIDS F/A-18 integration.
 - c. (U) Complete downsizing of HARM CLC in the F/A-18.
 - d. (U) Operational Flight Program (OFF) 95 incorporates MIDS software.
4. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRTESTCEN, Patuxent River, MD; NAVWPNCEN, China Lake, CA. **CONTRACTORS:** McDonnell Douglas, St. Louis, MO; Texas Instruments, Dallas, TX.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) Technical Changes: Not Applicable.
2. (U) Schedule Changes: Not Applicable.
3. (U) Cost Changes: Not Applicable.

F. (U) PROGRAM DOCUMENTATION:

1. (U) JOR, 1/81 and 7/89
2. (U) Acquisition Decision Memorandum (JTIDS Milestone IIIA), 10/89
3. (U) MIDS Mission Needs Statement, 4/90

G. (U) RELATED ACTIVITIES: Program Element 0205604N, Joint Tactical Information Distribution System (JTIDS): Funds integration and test costs for JTIDS on the following Navy platforms: E-2C, F-14D, CV, CG/CGN, and DDG. Program Element 0604771D, Common JTIDS: Funding develops and procures the Navy's JTIDS and MIDS full-scale development terminals.

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS:

- Terminal Project Definition MOU with Germany, Italy, France, and Spain, 14 Nov 86.
- Terminal PMOU and Pre-PSD Phase Supplement, 4 Oct 91

J. (U) TEST AND EVALUATION DATA: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205620N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ASW COMBAT SYSTEMS INTEGRATION (ASWCSI)
PROJECT NUMBER: V0896 PROJECT TITLE: ASW COMBAT SYSTEMS INTEGRATION (ASWCSI)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER PROGRAM	TITLE	FY1991 ACTUAL	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL
V0896	ASWCSI	17,521	19,021	19,555	CONT.	CONT.

B. (U) DESCRIPTION: Introduction of the AN/SQQ-89(V) Surface Ship Anti-Submarine Combat System (composed of the Underwater Fire Control System (UFGS) MK116 MOD 5/6/7/8/9, AN/SQR-19 Tactical Towed Array Sonar, AN/UYQ-25A Sonar In-Situ Mode Assessment System (SIMAS), AN/SQS-53B/C hull mounted sonars, and the Light Airborne Multi-Purpose System (LAMPS) MK III signal processor) in surface ships will generate large numbers of passive and active surface and subsurface sonar contacts. An integrated ASW control system is required to effectively correlate, classify, track, etc. contacts from the initial detection to an effective and expeditious threat engagement. This program element develops sensor integration and display sharing software applicable to DD 963, DDG 51 and CG 47 Class ships. The MK 116 MOD 5/6/7/8/9 ASW Control System is essential to ensure the effective utilization of new sensor systems. Without such an automated system, experience has shown that only one target can be manually correlated and tracked effectively.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:
 - a. (U) Continued design of MOD 8/9 computer programs for full utilization of Operational Specification (OPSPEC) 411.2 data.
 - b. (U) Continued development and test changes required for compatibility with Combat Direction System (CDS), Command & Decision (C&D) System, and other AN/SQQ-89 elements.
 - c. (U) Coordinated ASWCS development with all AN/SQQ-89 elements.
 - d. (U) Continued development required for MK 50 torpedo introduction.
 - e. (U) Developed MOD 7 OST training capability.
 - f. (U) Completed MOD 8/9 SIMAS (Desktop) interface.
 - g. (U) Continued safety efforts for MODs 7/8/9.
 - h. (U) Initiated MOD 7/SIMAS (Desktop) interface development.
 - i. (U) Continued the implementation of OPTVFOR deficiency corrections in MOD 7.
 - j. (U) Implemented selected design fixes as identified during MOD 7 OT IIB3 and OT IIB.
 - k. (U) Completed delivery of MOD 7 (DD 978) to Production Test Site (PTS) and Integrated Combat System Test Facility (ICSTF) for Combat System Integration Test (CSIT).
 - l. (U) Delivered MOD 8/9 computer program to Integrated Combat System Test Facility (ICSTF) for Combat System Integration Test (CSIT).
 - m. (U) Initiated ASWCS design concepts for Acoustic Video Processor (AVP) introduction.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205620N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ASW COMBAT SYSTEMS INTEGRATION (ASWCSI)
PROJECT NUMBER: V0896 PROJECT TITLE: ASW COMBAT SYSTEMS INTEGRATION (ASWCSI)

2. (U) FY 1992 PROGRAM:
 - a. (U) Complete design and initiate development of MOD 8/9 for full utilization of OPSPEC 411.2 data.
 - b. (U) Continue development and test changes required for compatibility with CDS, C&D, and other AN/SQQ-89 elements.
 - c. (U) Coordinate ASWCS development with all AN/SQQ-89 elements.
 - d. (U) Complete implementation of MOD 7 On-Board Trainer (OBT) training compatibility.
 - e. (U) Complete MOD 8/9 development of changes required for MK 50 torpedo introduction.
 - f. (U) Continue MOD 7/SINAS (Desktop) interface development.
 - g. (U) Continue implementation of AN/SQQ-89 system identified improvements.
 - h. (U) Continue safety effort for MODs 7/8/9.
 - i. (U) Continue MOD 7 development of changes required for MK 50 torpedo introduction.
 3. (U) FY 1993 PLANS:
 - a. (U) Complete development of MOD 8/9 programs with full OPSPEC 411.2 data utilization.
 - b. (U) Continue development and test changes required for compatibility with CDS, C&D, and other AN/SQQ-89 elements.
 - c. (U) Coordinate ASWCS development with all AN/SQQ-89 elements.
 - d. (U) Complete MOD 7 development of changes required for MK 50 torpedo introduction.
 - e. (U) Continue MOD 7/SINAS (Desktop) interface development.
 - f. (U) Continue ASWCS development of computer program modifications.
 - g. (U) Continue safety efforts for MODs 7/8/9.
 - h. (U) Initiate efforts to reduce ASWCS operator workload.
 4. (U) PROGRAM TO COMPLETION: This is a continuing program.
- D. (U) WORK PERFORMED BY: IN-HOUSE: NUSC, New London, Ct; NOSC, San Diego, Ca; NSWC, White Oak, Md; Naval Sea Combat System Engineering Station, Norfolk, Va. CONTRACTORS: EG&G Washington Analytical Services Center, Inc., Rockville, Md; Hughes Aircraft Company, Fullerton, Ca; General Electric Co., Syracuse, NY; Westinghouse, Sykesville, Md; Sciences Application Incorporated, San Diego, Ca; Sperry-Univac, Minneapolis, Mn; and Matrix, Inc., Arlington, Va.
- E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:
 1. (U) TECHNOLOGY CHANGES: Not Applicable.
 2. (U) SCHEDULE CHANGES: Delayed introduction of SET V operational software which incorporates MK 50 Torpedo (for ASWCS MODs 5/6/8 and 9) Over-The-Side (OTS) capability and other enhancements to ASWCS computer programs.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205620N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: ASW COMBAT SYSTEMS INTEGRATION (ASWCSI)

PROJECT NUMBER: V0896

PROJECT TITLE: ASW COMBAT SYSTEMS
INTEGRATION (ASWCSI)

3. (U) COST CHANGES: FY 1993 reduction of \$1,246K due to pricing adjustments for CASS, inflation, and DEOF rates.

F. (U) PROGRAM DOCUMENTATION: NDCP V0896-AS 5/81

G. (U) RELATED ACTIVITIES: Program Element 0604212N, Project W1707 (Light Airborne Multi-Purpose System MK III): development of an anti-submarine warfare helicopter for deployment with surface ships. Program Element 0604713N, Project V1916 (Surface ASW Systems Improvement): develops upgrades to the sensors to counter recently identified threat improvements, including reductions in radiated noise, and Over The Side (OTS) MK 50 Torpedo integration.

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE: Not Applicable.

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FY 1993 RDTEE, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205633N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AIRCRAFT EQUIPMENT RELIABILITY/MAINTAINABILITY PROGRAM
PROJECT NUMBER: W1041 PROJECT TITLE: AERMIP (AERMIP)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE CONT.	TOTAL PROGRAM CONT.
W1041	AERMIP	419	2000	1918		

B. (U) DESCRIPTION: AERMIP provides RDTEE engineering support to in-service, out-of-production aircraft equipment. AERMIP increases readiness through reliability, maintainability, and safety improvements and provides the most cost effective solution to parts obsolescence when aircraft service life is extended. It promotes commonality through extension of application or use of Non-Development Items. AERMIP applies proven new technologies to improve readiness and reduce costs. AERMIP supports the OSIP (Operational, Safety, and Improvement Program) by providing low risk solutions to current Fleet problems. AERMIP also funds high priority flight testing which is not associated with current acquisition or development programs under the Flight Test General (FTG) task.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:
 - a. (U) Continued Common Altimeter engineering task.
 - b. (U) Continued H-60/H-3/H-46 FTG Simulation task.
 - c. (U) Conducted T-39W certification evaluation for Naval Flight Officer training mission.
2. (U) FY 1992 Program:
 - a. (U) Start ASW-33 Rate Gyro, S-3 Carbon Brake, MA-1 Compass, H-46 Supervisory Panel, Common Standby Gyro and S-3 Bearings redesign tasks.
 - b. (U) Continue FY 1991 tasks.
3. (U) FY 1993 Plans:
 - a. (U) Continue S-3 Carbon Brake redesign and FTG tasks.
 - b. (U) Conclude S-3 Automatic Flight Control Bearings, Common Altimeter, MA-1 Compass, H-46 Supervisory Panel and ASW-33 Rate Gyro redesign tasks.
 - c. (U) Start C-2 Electronic Converter and A-6 Brake redesign tasks.
4. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAC, Indianapolis, IN and NATC, Patuxent River, MD and others. CONTRACTORS: Lockheed, Burbank, CA; IS&S, Malvern, PA and others.

E. (U) RELATED ACTIVITIES: P. E. 0604203N, Standard Avionics Development; P.E. 0708026F, Producibility, Reliability, Availability and Maintainability (PRAM)

F. (U) OTHER APPROPRIATION FUNDS: Not applicable.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205658N

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE: LABORATORY FLEET SUPPORT

PROJECT NUMBER: X0834 PROJECT TITLE: LABORATORY FLEET SUPPORT

A. (U) RESOURCES: (Dollar in Thousands)

Project Number	Title	FY1991 Actual	FY1992 Estimate	FY1993 Estimate	To Complete	Total
Program X0834	Laboratory Fleet Support					
	Total	7,316	4,973	7,821	Cont.	Cont.

B. (U) DESCRIPTION: Provides assistance to the Fleet by on-site support of 28 to 30 scientists and engineers from the Navy Warfare Centers. Program ensures communications between technology producer (Navy RDT&E community) and technology customer (Navy/Marine Corps operating forces). Program technological support initiatives evolve from user needs and requirements.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS (CUSTOMER/PRODUCER):

1. (U) FY 1991 Accomplishments:

a. (U)

b. (U)

c. (U)

& dispense hydr

d. (U)

e. (U) Naval Supply Center (NSC) protective clothing cooling system evaluated for procurement selection process (CGFMFPAC/Naval Health Research Center).

f. (U)

g. (U) Shipboard sonar-based mine detection evaluated and deployed during DESERT STORM (COMIDEASTFOR/Naval Air Development Center).

h. (U)

i. (U)

1. (U)

2. (U) FY 1992 Program:

a. (U) Battlefield EW multiple inputs integrated/correlated (CGFMFPAC).

b. (U) Tactical Flag Command Center (TFCC) man/machine interface enhancements (COMSEVENTHFLT)

c. (U)

d. (U)

e. (U)

f. (U)

g. (U) Additional programs as required by Fleet customer.

3. (U) FY 1993 Plans: Identify issues and provide link to RDT&E community. Projects will vary according to fleet customer requirements.

4. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NSWC Dahlgren, VA; NAC Indianapolis, IN; NADC Warminster, PA; NCEL Port Hueneme, CA; NCSC Panama City, FL; NOSC San Diego, CA; NRL Washington, DC; NHRC San Diego, CA.

E. (U) RELATED ACTIVITIES: PE 0602936N, NSAP IED. Major systems programs are affected as fleet customer needs are identified.

F. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205667N
 PROGRAM ELEMENT TITLE: F-14 Upgrade
 PROJECT NUMBER: E1408

BUDGET ACTIVITY: 4
 PROJECT TITLE: F-14D Upgrade



POPULAR NAME: F-14D TOMCAT

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	TO COMPLETE
PROGRAM		III-A3		
MILESTONES		12/91		
ENGINEERING				
MILESTONES				
T&E			OTIID	DT/OT
MILESTONES			10/92	IIIA
CONTRACT	01/91			
MILESTONES	APG-71 AWARD			
BUDGET (\$K)	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
MAJOR	73,839	50,909	39,004	
CONTRACT				Continuing
SUPPORT	669	465	257	
CONTRACT				
IN-HOUSE	34,307	51,677	39,521	
SUPPORT				Continuing
GFE/	10,935	12,217	22,446	
OTHER				Continuing
TOTAL	119,750	115,268	101,228	Continuing*

*Reflects weapons integration

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205667N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: F-14 Upgrade

PROJECT NUMBER: E1408

PROJECT TITLE: F-14D Upgrade

B. (U) DESCRIPTION: This program element provides for operational improvement of Navy F-14 squadrons in order to counter the projected threat through the year 2000 and beyond. The F-14D will have increased capability in three major areas: new engine, new digital avionics and upgraded radar. These changes will yield significant improvements in capability and performance as well as reliability and maintainability, and will facilitate the total integration and exploitation of related programs i.e., Air Force Common Joint Tactical Information Distribution System (JTIDS), Airborne Self-Protection Jammer (ASPJ) and Infrared Search and Track System (IRSTS). A Pre-deployment Update (PDU) program (primarily software) includes ANRAAM, fighter-to-fighter data link, Multi-Sensor Mechanization, and radar/ECCM improvements for the F-14D. The PDU program was created because of concurrent development of the F-14D and the above listed common avionics and weapons. It implemented the capabilities inherent in systems incorporated during the full scale development (FSD) program and is a planned integral part of the evolution of the F-14D aircraft. F-14D weapons integration supports integration of electronic warfare improvements, addition of new weapons (i.e., HARPOON, HARM, etc.) the single-piece windscreen, correction of OPEVAL deficiencies, incorporation of digital flight controls, and various software upgrades.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Finished OPEVAL (December 1990).
- b. (U) Continued PDU Hardware/Software integration and testing.
- c. (U) Completed initial trainer development.
- d. (U) Finished DT-IIB (TECHEVAL) and commenced OT-IIB (OPEVAL) on Longwave IRSTs.
- e. (U) Commenced PDU flight test.
- f. (U) Investigated/integrated software enhancements resulting from OPEVAL.
- g. (U) Corrected high priority deficiencies identified in F-14D OPEVAL.

2. (U) FY 1992 PROGRAM:

- a. (U) Conducted NPDM Milestone III-A3 for Limited Production decision (December 1991).
- b. (U) Continue PDU hardware/software integration.
- c. (U) Continue PDU flight test.
- d. (U) Begin preliminary design for weapons integration.
- e. (U) Conduct IV&V on the first PDU tape.
- f. (U) Deliver final 3 FSD longwave IRST systems.
- g. (U) Conduct NPDM Milestone III-A2 for limited production of 40 longwave IRST systems (April 1992).
- h. (U) Conduct DT-IIC (TECHEVAL) on longwave IRST systems.
- i. (U) Delivery of longwave IRST production systems.
- j. (U) Continue correction of F-14D OPEVAL deficiencies.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205667N
PROGRAM ELEMENT TITLE: F-14 Upgrade
PROJECT NUMBER: E1408

BUDGET ACTIVITY: 4
PROJECT TITLE: F-14D Upgrade

3. (U) FY 1993 PLANS:
- a. (U) Continue PDU hardware/software integration and testing.
 - b. (U) Continue PDU flight test.
 - c. (U) Conduct DT/OT on second PDU tape.
 - d. (U) Complete DEMVAL for weapons integration.
 - e. (U) Conduct OT-IID (OPEVAL Phase II) on F-14D concurrent with OT-IIC (OPEVAL) on LongwaveIRST systems.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAPC, Trenton, NJ; NATC, Patuxent River, MD; PMTC, Point Mugu, CA; NWC, China Lake, CA; NADC, Warminster, PA; NAC, Indianapolis, IN; NAEC, Lakehurst, NJ; NADOC, Patuxent River, MD; NADED, Norfolk, VA; NADEP, North Island, CA; NTSC, Orlando, FL. CONTRACTORS: Grumman Aerospace Corporation, Long Island, NY; General Electric, Evandale, OH; General Electric, Utica NY; and Hughes Aircraft Company, El Segundo, CA.

- E. (U) COMPARISON WITH FY 1992/93 PRESIDENT'S BUDGET:

- 1. (U) TECHNICAL CHANGES: None.
- 2. (U) SCHEDULE CHANGES: The anticipated Program Milestone IIIB NPDM was changed from March 1991 to a III-A3 in December 1991. T&E Milestones DT/OT IIIA, IIIB, and IIIC reflect a slip of two fiscal years from the previous schedule. Slip is caused by late OPEVAL completion and a requirement for subsequent OPEVAL (Phase II) testing concurrent with Pre-Deployment Update (PDU) software tape release F14D01 in early FY 1993. Delivery of three (3) final PSD Language IRST System has slipped to FY 1992 due to technical problems.

- 3. (U) COST CHANGES: None.

F. (U) PROGRAM DOCUMENTATION: OR 05/84; NDCP Updated 12/89; TEMP Updated 06/90.

- G. (U) RELATED ACTIVITIES:

Program Element 0205604N, Tactical Information Systems and 0604771D, Joint Tactical Information Distribution System (JTIDS).
Program Element 0604720N, Consolidated EW Program
Program Element 0604314N, AMRAAM
Program Element 0204134N, A-6 Squadrons (initial trainer commonality)

- H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
PROCUREMENT:					
APN/P1					
#6	1,139,018	172,519	143,147	26,643	4,662,713

- I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) TEST AND EVALUATION: This information is included in the FY 1993 Congressional Data Sheets.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205670N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Tactical Intelligence Processing

PROJECT NUMBER: X0521 PROJECT TITLE: Shipboard TAC Intel. Processing

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT

NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X0521	SHPD TAC INTEL PROCESSING	4,875	2,096	2,506	Cont.	Cont.

B. (U) DESCRIPTION: Shipboard Tactical Intelligence Processing System (STIP) is an integrated tactical shipboard processing system which is the central data base for the Navy Tactical Command System-Afloat (NTCS-A), Space and Electronic Warfare Console (SEWC) and tactical mission planning systems. Developing this integrated data base server provides for data distribution (dynamic update of Naval Warfare Tactical Data Base (NWTDB) and Military Integrated Intelligence Data System/Intelligence Data Base (MIIDS/IDB)) and integration with digital map and imagery systems. STIP began interface development with the Joint Services Imagery Processing System - Navy (JSIPS-N) in FY 1990.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. FY 1991 ACCOMPLISHMENTS:

a. (U) Continued integration of the SYQ-9(V)/MIIDS/IDB with the dynamic data base update and compression techniques to support digital imagery via available communication paths.

b. (U) Completed initial prototype capability that incorporates JSIPS functionality.

c. (U) Commenced development of improved digital imagery/transmission capability for the Fleet Imagery Support Terminal (FIST).

2. FY 1992 PROGRAM:

a. (U) Continue integration of SYQ-9(V) and MIIDS/IDB.

b. (U) Complete development of improved digital imagery/transmission capability for FIST.

c. (U) Develop and integrate state-of-the-art hardware into STIP to support Sensitive Compartmented Information (SCI) requirements.

3. FY 1993 PLANS:

a. (U) Continue development testing and integration of SYQ-9(V) and MIIDS/IDB to support Battle Force Power Projection, Imagery Improvements and Closed Circuit Television (CCTV) Upgrade.

b. (U) Continue development of STIP capability to handle SCI requirements.

c. (U) Begin development of STIP capability to support cryptologic functions in Navy Tactical Command System-Afloat (NTCS-A).

4. (U) PROGRAM TO COMPLETION: Continue software development and integration into a unitary software baseline for C3I systems afloat. This is a continuing program.

D. (U) WORKED PERFORMED BY: IN-HOUSE: NAVELEXACT, St. Inigoes, MD; NAVOCEANSYSCEM, San Diego, CA, and NAVELEXSYSENGACT DET Philadelphia, PA. CONTRACTORS: Planning Research Corp., McLean, VA and SAIC Vienna, VA.

E. (U) RELATED ACTIVITIES: PE 0604231N, Tactical Command Systems (NTCS-A project). STIP is the central database server for NTCS-A.

F. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETION	TOTAL PROGRAM
(U) PROCUREMENT					
OPN BA 2 #76	2,672	16,217	9,519	Cont.	Cont.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205675N BUDGET ACTIVITY: 4
 PROGRAM ELEMENT TITLE: Operational Reactor Development
 PROJECT NUMBER: S1303 PROJECT TITLE: Operational Reactor Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1303	Operational Reactor Development	56,618	58,236	57,834	CONTINUING	CONTINUING

B. (U) DESCRIPTION: The objective is to ensure continued safe nuclear propulsion plant operation and improve the operability of plants. This program designs, develops, tests and evaluates improvements to systems and the means to increase component reliability; develops equipment and methods needed for servicing, inspections and evaluations; and develops methods to reduce component and servicing inspections. The need to resolve problems, and to emulate and assess plant performance will increase as the size of the fleet decreases and, consequently, as the value of each ship increases.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Initiated equipment checkout for upcoming LOS ANGELES Class refuelings; qualified the M140 shipping container for S3G cores; initiated equipment checkout of S8G refueling equipment applicable to the TRIDENT Class; developed streamlined techniques for inactivating S3G plants in S5W submarines.
- b. (U) Continued testing operating plant materials and developing models;
- c. (U) Qualified and expanded implementation of in the secondary water chemistry of late-in-life S5W submarines' first use of reducing personnel radiation exposure during a steam generator inspection continued work on steam generator repair tools.
- d. (U) Started development of a pressurizer inspection system; removed pressurizer samples completed analysis of heaterwell end caps.
- e. (U) Continued thermal, hydraulic, mechanical and structural analyses to establish reactor operating limits and resolve performance concerns.
- f. (U) Continued to develop examination methods for in-service inspection of nuclear plant components; continued to develop welding and cutting techniques.
- g. (U) Continued evaluation of data to identify problems; began efforts to improve performance of the variable frequency converter; completed conceptual design and selected a vendor to build a test model for the alternate mechanical design scram circuit breaker; completed conceptual designs to select vendor for the scram circuit breaker; started preproduction for improved scram release switch; approved design modifications and began qualification testing of coolant pump circuit breaker; these developments focus on resolving component problems and improving reliability.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205675N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Operational Reactor Development

PROJECT NUMBER: S1303

PROJECT TITLE: Operational Reactor Development

h. (U) Continued to develop methods and capabilities to backfit advanced equipment into operating plants; continued to develop systems to model plant operations; completed preliminary development of a third means of indication.

2. (U) FY 1992 PROGRAM:

a. (U) Develop procedures to improve steam generator inspections and cleanings; evaluate expanded use of alternate water chemistry for SSG plants

inspection and repair equipment to minimize personnel radiation exposure.

b. (U) Design, develop, and evaluate reactor servicing and refueling techniques and equipment for the first of a kind servicing of LOS ANGELES Class submarines, TRIDENT submarines, and NIMITZ Class carriers. Continue to develop and qualify containers for shipping irradiated fuel and radioactive components.

c. (U) Conduct prototypic testing of improved component designs. Continue to resolve concerns about the performance of components such as pressurizers. Analyze samples of removed pressurizers

Continue to develop simpler, more reliable circuit breakers and control equipment to reduce concerns and maintenance problems in existing reactor plants.

d. (U) Conduct further thermal, hydraulic, and structural tests and analyses to confirm reactor operating limits and resolve performance concerns.

e. (U) Continue to develop examination methods for in-service inspection of nuclear plant components; complete welding and cutting development and continue work on improved welding techniques.

f. (U) Develop methods and capabilities to backfit advanced equipment into existing operating plants. Evaluate a third means of indication; continue to develop systems to model plant operations.

3. (U) FY 1993 PLANS:

a. (U) Develop improved processes for testing and analyzing performance data and predicting component failures; continue to qualify nitrate for implementation. Modify and enhance inspection equipment.

b. (U) Continue to develop procedures and designs while reducing maintenance. Continue prototypic testing of improved component designs. Continue to resolve concerns about the performance of components such as pressurizers.

c. (U) Continue to: design and develop reactor servicing and refueling methods and equipment; design, develop and evaluate reactor servicing and refueling methods and equipment, for backfitting LOS ANGELES Class submarines, TRIDENT submarines, and NIMITZ Class carriers; Test and certify containers for shipping irradiated fuel and radioactive components.

d. (U) Continue to develop capabilities to backfit advanced equipment into operating plants. Develop improved equipment for integration into existing reactor plants to improve operating efficiency, reliability, and maintainability.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0205675N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Operational Reactor Development.

PROJECT NUMBER: S1303

PROJECT TITLE: Operational Reactor Development

e. (U) Continue to develop methods to confirm reactor operating limits and resolve component performance concerns. Continue to develop systems to model plant operations.

f. (U) Develop examination techniques, less dependent on the operator, to increase inspection efficiency.

4. (U) **PROGRAM TO COMPLETION:** This is a continuing program.

D. (U) **WORK PERFORMED BY:** Contractors: Westinghouse Electric Corporation, Bettis Atomic Power Laboratory and Plant Apparatus Division, Pittsburgh, PA; General Electric Company, Knolls Atomic Power Laboratory and Machinery Apparatus Operation, Schenectady, NY.

E. (U) **COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:**

1. (U) Technology Changes: Not Applicable.
2. (U) Schedule Changes: Not Applicable.
3. (U) Cost Changes: Reduction of \$2.3M due to lower inflation assumptions and changes in DBOF rates.

F. (U) **PROGRAM DOCUMENTATION:** Not Applicable.

G. (U) **RELATED ACTIVITIES:**

- Program Element 0602324N, Nuclear Propulsion Technology
- Program Element 0603570N, Advanced Nuclear Power Systems
- No duplication of effort occurs.

H. (U) **OTHER APPROPRIATION FUNDS:** Not Applicable.

I. (U) **INTERNATIONAL COOPERATIVE AGREEMENTS:** Not Applicable.

J. (U) **MILESTONE SCHEDULE:** Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206313M

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Marine Corps Telecommunications

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C0048	Transmission Subsystems Improvement	1,419	549	452	CONT.	CONT.
C1931	Communications Ancillary Equipment	992	2,395	3,073	CONT.	CONT.
C1975	Digital Communication Terminal (Product Improvements)	2,906	866	664	CONT.	CONT.
TOTAL		5,317	3,810	4,189	CONT.	CONT.

B. (U) DESCRIPTION: This program element provides for the development and improvement of Marine Corps ground telecommunications items not being developed within the chartered responsibilities of the Joint Tactical Communications Agency. Equipments developed within this program support the mission area of command and control and support the command and control mission accomplishment.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206313M

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Marine Corps Telecommunications

PROJECT NUMBER: C0048 PROJECT TITLE: Transmission Subsystems Improvement

C. (U) DESCRIPTION: The project develops enhanced technical software and hardware interoperability to High Frequency (HF), Very High Frequency (VHF) and Ultra High Frequency (UHF) radios.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Continued development of the joint application software for the Data Transfer Device (DTD).

b. (U) Received, tested and evaluated AN/TSC-120 pre-planned product improvement (P3I) radio prototypes.

c. (U) Provided US Army with Marine Corps requirements for a Survivable Low Profile Antenna (SLPA) to be mounted on armored vehicles using Single Channel Ground Air Radio System (SINGARS).

2. (U) FY 1992 PROGRAM:

a. (U) Continue development of joint application software for DTD.

b. (U) Perform Operational Test (OT) on AN/TSC-20 P3I radio prototypes.

c. (U) Develop software training packages and maintenance manuals for the TSC-120 P3I radio.

d. (U) Develop SINGARS UHF installation kits.

e. (U) Procure prototype Have Quick Word-of-Day fill devices for testing.

f. (U) Perform OT on prototype Near Vertical Incidence System (NVIS) antenna adapters.

g. (U) Test hardware solutions to improve performance of SINGARS in a co-site environment.

3. (U) FY 1993 PLANS:

a. (U) Continue development of: DTD software for support of SINGARS and UHF Have Quick operations; enhancement to interoperability of AN/TSC-120; and SINGARS installation kits.

b. (U) Start development of manpack NVIS antenna adapters and Have Quick Time of Day reception system.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NOSC, San Diego, CA; MCTSSA, Camp Pendleton, CA; NESEA, St Indigoes, MD; Mitre, Boston, MA; ECAC, Annapolis, MD. CONTRACTORS: ITT, Ft Wayne, IN; Hughes Aircraft, Fullerton, CA; General Dynamics, San Diego, CA; Rockwell, El Paso, TX.

F. (U) RELATED ACTIVITIES: Program Element 0303401N, Communication Security.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

(U) PROCUREMENT	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
SINGARS	0	52,398	59,837	CONT.	CONT.
AN/GRC-171B(v)4	0	0	19,388	0	19,388
AN/TSC-120	0	0	5,323	0	5,323

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY
 PROGRAM ELEMENT: 0206313M
 PROGRAM ELEMENT TITLE: Marine Corps Telecommunications
 PROJECT NUMBER: C1931 PROJECT TITLE: Communications Ancillary Equipment

BUDGET ACTIVITY: 4

C. (U) DESCRIPTION: Monitor development of tactical Ultra High Frequency (UHF), Super High Frequency (SHF) and Extremely High Frequency (EHF) Satellite Communication (SATCOM) terminals. Develop modifications to the AN/TSC-96 UHF SATCOM System to maintain interoperability with Navy SATCOM network. Develop improvements to multi-channel radio systems.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Installed Demand Assign Multiple Access (DAMA) modifications in AN/TSC-96 UHF.

b. (U) Developed and installed advanced narrowband digital voice terminal (KY-99) secure voice modification in the AN/TSC-96.

c. (U) Continued participation with Army on AN/PSC-3 UHF upgrade.

d. (U) Developed the AN/MRC-142 Electronic Counter Countermeasure (ECCM) requirements.

2. (U) FY 1992 PROGRAM:

a. (U) Develop a single van AN/TSC-96A modification.

b. (U) Continue participation with Army on AN/PSC-3 DAMA upgrade.

c. (U) Monitor Army development of MILSTAR terminals.

d. (U) Develop AC power supply for AN/PSC-3.

e. (U) Evaluate Advanced Data Controller (ADC).

f. (U) Develop remote capability for AN/PSC-3.

g. (U) Determine AN/MRC-142 ECCM, Uninterruptable Power Supply (UPS) and Digital Group Multiplex (DGM) specifications and explore ECCM advanced engineering models.

3. (U) FY 1993 PLANS:

a. (U) Continue AN/TSC-96A modification, participation with Army on AN/PSC-3 upgrade and monitor Army development of MILSTAR terminals.

b. (U) Modify existing antenna towers for USMC application.

c. (U) Evaluate ECCM, UPS and DGM prototypes.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NESEC, Vallejo, CA; PM SATCOM, Ft Monmouth, NJ; MARCORSYSCOM, Quantico, VA. CONTRACTORS: NONE.

F. (U) RELATED ACTIVITIES: NONE.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

(U) PROCUREMENT	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
MK-2678	500	0	0	0	500
ANTI-JAM CONTROL MODEN	246	0	0	0	246
AN/TSC-96/PIP	0	0	1,957	1,600	3,557
TSC 85A/93A Mod	1,619	694	619	622	3,554
AN/TRC-170	31,150	11,764	0	0	77,526
AN/MRC-142	19,492	18,956	0	0	38,448

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206313M BUDGET ACTIVITY: 4
 PROGRAM ELEMENT TITLE: Marine Corps Telecommunications
 PROJECT NUMBER: C1975 PROJECT TITLE: Digital Communication Terminal (DCT)
 (Product Improvements)

C. (U) DESCRIPTION: Initial development of the DCT was completed in FY 1991. The DCT is a lightweight programmable message processor providing the user with a capability of transmitting and receiving formatted and free text messages. This project will develop application programs to meet operational requirements.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Developed software application programs to support operational requirements of Marine Corps commands.

b. (U) Initialized review of a DCT emulation capability within a standard personal computer (PC).

c. (U) Completed software improvements to the AN/PSC-2.

2. (U) FY 1992 PROGRAM:

a. (U) Develop software application programs to support operational requirements of Marine Corps commands.

b. (U) Continue to examine advanced technology for Product Improvement Program.

c. (U) Review and monitor industry advancements in random access memory (RAM) micro-circuits and screen displays to incorporate into current telecommunications capabilities.

3. (U) FY 1993 PLANS:

a. (U) Continue development of software application programs to support operational requirements of Marine Corps commands.

b. (U) Continue to examine a DCT emulation capability within a PC.

c. (U) Review and monitor industry advancements in RAM micro-circuits and screen displays to incorporate into current telecommunications capabilities.

4. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MCTSSA, Camp Pendleton, CA; Naval Avionics Center, Indianapolis, IN. CONTRACTORS: Litton Data Systems Division, Van Nuys, CA. ITT Aerospace/Communications Division, Fort Wayne, IN.

F. (U) RELATED ACTIVITIES: NONE.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

(U) PROCUREMENT	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
P-1# 55 TCC	5,935	0	0	0	15,145
P-1# 68 DCT	9,574	0	0	0	13,141

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206623M

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Supporting Arms Systems

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C0010	SKAW	2,052	1,119	794	176	31,563
C0018	FIRE SUPT SYS	930	0	0	0	3,966
B0021	AAV7A1	9,441	3,988	3,727	4,731	64,860
C1120	ADMS	8,324	3,590	3,899	CONT.	CONT.
C1555	LAV Program	2,206	1,652	1,687	1,746	118,112
C1763	AAS	290	451	527	CONT.	CONT.
C1901	Ground Weaponry PIP	3,149	4,634	6,831	CONT.	CONT.
C1960	LAV-AD	13,752	12,226	2,980	3,590	86,708
C2086	Soldier Marine Enhancement	12,000	12,000	0	0	35,678
	TOTAL	52,144	39,660	20,445	CONT.	CONT.

B. (U) DESCRIPTION: This program element provides modification to Marine Corps Expeditionary Ground Force Weapons Systems to increase lethality, range, survivability, and operational effectiveness. It also provides for the block upgrades of the AAV7A1, improvements in command and control in the Air Defense Missile System; product improvements to the family of the Light Armored Vehicles (LAV); and the development effort for the LAV-Air Defense (LAV-AD) variant.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206623M

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Supporting Arms Systems

PROJECT NUMBER: C0010 PROJECT TITLE: SMAW Mod 1 Launcher

C. (U) DESCRIPTION: The Shoulder-launched Multipurpose Assault Weapon (SMAW) is a lightweight, manportable assault weapon with a dual-mode round capable of defeating field/urban fortifications and light armored vehicles. The follow-on High Explosive Anti-Armor (HEAA) projectile warhead is presently in Low Rate Initial Production (LRIP). The launcher is a smoothbore fiberglass and epoxy tube equipped with a spotting rifle and optical sight. The Mod 1 launcher effort is a block upgrade that will correct deficiencies and improve reliability and maintainability.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Restructured launcher program to maximize reliability, maintainability and productively.
- b. (U) Continued engineering design.
- c. (U) Fabricated and tested first prototype.
- d. (U) Continued integrated logistics support (ILS) and safety tasks.

2. (U) FY 1992 PROGRAM:

- a. (U) Continue engineering design and analysis.
- b. (U) Fabricate Engineering Development Models (EDMs).
- c. (U) Continue integrated logistics support and safety tasks.

3. (U) FY 1993 PLANS:

- a. (U) Test EDMs.
- b. (U) Conduct Critical Design Review (CDR) and freeze design.
- c. (U) Fabricate Developmental Test II (DT II) and Operational Test II (OT II) on launchers and begin DT II.
- d. (U) Continue integrated logistics support and safety tasks.

4. (U) PROGRAM TO COMPLETION: This program completes research and development effort in FY 1994.

E. (U) WORK PERFORMED BY: IN-HOUSE: NSWC, Dahlgren, VA. CONTRACTORS: TBD.

F. (U) RELATED ACTIVITIES: Not Applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206623M

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Supporting Arms Systems

PROJECT NUMBER: B0021 PROJECT TITLE: AAV7A1

C. (U) DESCRIPTION: This project was formerly titled LVT 7A 1 Program. The Assault Amphibious Vehicle 7A1 Product Improvement Program (AAV7A1 PIP) sustains the capability to conduct surface-borne amphibious assaults by improving the present amphibious vehicle so that its effectiveness will be extended until a successor vehicle is fully fielded by FY 2010.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Developed, tested and fielded vehicle pre-planned product improvements, including the Upgunned Weapons Station (UGWS), the Rotary Bow Plane Kit (RBPk), Enhanced Applique Armor Kit (EAAK) and the Automatic Fire Sensing and Suppression System (AFSSS).

b. (U) Completed engineering design and fabrication of Improved Transmission (I-Trans) and Improved Suspension (I-Susp).

c. (U) Began concept design on Advanced Propulsion System (APS).

2. (U) FY 1992 PROGRAM:

a. (U) Complete improved suspension testing.

b. (U) Award improved suspension contract.

c. (U) Continue testing of the Advanced Propulsion System.

d. (U) Initiate development and testing of modification kits. These modification kits include overboard exhaust, Single Channel Ground Air Radio System (SINGARS) radio installations, smoke generation and other kits developed as a unit.

3. (U) FY 1993 PLANS: Continue development and testing of modification kits, to include Nuclear/Biological/Chemical (NBC), Thermal Day/Night Range Sight (DNRS), APS, and other kits resulting from user input.

4. (U) PROGRAM TO COMPLETION:

a. (U) Maintain current amphibious assault fleet until AAV7A1 capability replacement is fielded.

b. (U) This program completes the research and development phase in FY 1996.

E. (U) WORK PERFORMED BY: IN-HOUSE: DTRC, Bethesda, MD. CONTRACTORS: TBD.

F. (U) RELATED ACTIVITIES: Program Element 0603611M, Marine Corps Assault Vehicles.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

(U) PROCUREMENT	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
PMC P-1# 42 AAV7A1 PIP	38,894	15,928	16,610	CONT.	CONT.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: On 22 October 1991, the government of Brazil signed a Letter of Acceptance (LOA) for the procurement of ten AAV7A1s with improvements. The estimated total cost is \$33 million. This procurement will result in start-up of a production line in FY 1994.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206623M

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Supporting Arms Systems

PROJECT NUMBER: C1120 PROJECT TITLE: Air Defense Missile System (ADMS)

C. (U) DESCRIPTION: The Air Defense Command and Control (AD C2) provides hardware and software improvements to the HAWK and STINGER Missile System. Includes efforts to improve tactical digital interface cuing and command and control for all ground based air defense. Also develops data link capability with Tactical Air Data Information Link-A (TADIL A), TADIL B, LINK 1 and Army Tactical Data Link-1 (ATDL-1). The Avenger (Pedestal Mounted STINGER) System (PMS) is a lightweight, mobile, gun-missile hybrid mounted on a high mobility multi-purpose wheeled vehicle (HMWV). Pedestal Mounted STINGER is a non-developmental item. The STINGER Night Sight (SNS) is a lightweight (under 5 lbs), battery powered viewer that attaches to the STINGER missile system for day/night/reduced visibility operations.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) AD C2: Began testing of TADIL A, B and integration of command and control software.

b. (U) HAWK: Continued field testing of expeditionary HAWK, passed Pulse Acquisition Radar (PAR) & Identification Friend or Foe (IFF) data by radio to HAWK equipment.

c. (U) Avenger: Initiated Engineering Services for USMC AD C2 interface into the turret and continued program documentation.

d. (U) SNS: Issued development contract for pre-production model evaluation. Began technical evaluations at Naval Weapons Support Center, Crane, Indiana. Developed interim solution Night Sight to support Operations Desert Shield/Storm.

2. (U) FY 1992 PROGRAM:

a. (U) AD C2: Begin MS III testing of C2 and data links.

b. (U) HAWK: Joint work with Army for three dimensional (3D) radar to replace current radars. Begin work on complimentary missile.

c. (U) Avenger: Continue engineering services on USMC AD C2 integration for early warning and cuing and engineering studies for USMC unique modifications. Developed maintenance plan for logistics support and performed qualitative assessment to validate Avenger concept of employment.

d. (U) SNS: Completed technical evaluation, field testing, and qualitative assessment to support milestone decision for low rate production.

3. (U) FY 1993 PLANS:

a. (U) AD C2: Complete MS III C2 tactical digital interface testing and integration of datalinks. Finish software/hardware modifications.

b. (U) HAWK: Continue working on 3D radar and complimentary missile.

c. (U) PMS: Continue In-Service Engineering Agent tasking for USMC unique modifications.

d. (U) SNS: In-Service Engineering Agent tasking for pre-planned product improvements (P3I) studies to increase resolution and weight reduction.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NICON, Redstone Arsenal, AL; NWSC, Crane IN. CONTRACTORS: Boeing Aerospace, Huntsville, AL.

F. (U) RELATED ACTIVITIES: All US Army HAWK and PMS activities.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

(U) PROCUREMENT	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
PMC P-1 #51 HAWK	21,100	0	0	0	21,100
#54 PMS	0	12,900	28,113	CONT.	CONT.
#87 SNS	0	1,459	6,200	6,200	13,859

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206623M

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Supporting Arms Systems

PROJECT NUMBER: C1555 PROJECT TITLE: Light Armored Vehicle (LAV) Program

C. (U) DESCRIPTION: The family of LAVs consists of six fielded configurations with operational capabilities that significantly enhance the mobility and firepower of the Marine Air Ground Task Force (MAGTF). Since the original urgency of need dictated the fielding of essentially off the shelf vehicles, this project provides the resources to develop, test, and evaluate designated preplanned product improvements.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Continued development of the 81mm LAV Mortar Mount system.
- b. (U) Evaluated LAV brake system improvements.

2. (U) FY 1992 PROGRAM:

- a. (U) Complete development of the 81MM LAV Mortar Mount system.
- b. (U) Initiate LAV-25mm assault gun night sight integration.

3. (U) FY 1993 PLANS: Complete evaluation of LAV brake system improvements.

4. (U) PROGRAM TO COMPLETION: Program completes in FY 1994.

E. (U) WORK PERFORMED BY: IN-HOUSE: MCRDAC, Quantico, VA; PM-LAV, U.S. Army Tank-Automotive Command, Warren, MI; Naval Surface Warfare Command, Dahlgren, VA; David Taylor Research Center, Bethesda, MD. CONTRACTORS: Diesel Division of GM, London, England and Ontario, Canada.

F. (U) RELATED ACTIVITIES: Not Applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206623M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Supporting Arms Systems
PROJECT NUMBER: C1763 PROJECT TITLE: Amphibious Armor Systems (AAS)

C. (U) DESCRIPTION: This project provides RDT&E for Marine Corps unique Amphibious Armor improvements for the M1A1 Main Battle Tank (MBT). It also supports requirements to improve the effectiveness of existing vehicles and support systems (M1A1 MBT, AVLB, and M88A1 RTV). In the past, funds were used to develop the Deep Water Fording Kit (DWFK), Position Location Reporting System (PLRS), and Enhanced Ship Tie-downs for the M1A1 MBT. Currently, funds are being used to integrate the Forward Observer/Forward Air Controller (FO/FAC) radio suite into the M1A1 MBT. Future requirements include Armament Enhancement Initiative (AEI), Optical Improvement Program (OIP), and Suspension Improvements for the M1A1 MBT.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Initiated development and integration of Forward Observer/Forward Air Controller radio suite.

2. (U) FY 1992 PROGRAM:

a. (U) Complete development and integration of Forward Observer/Forward Air Controller radio suite.

b. (U) Monitor Army's M1A1 Product Improvement Program and explore other developments for affordable, effective, and weight sensitive improvements to satisfy Marine Corps Amphibious Armor requirements of the expeditionary force role.

3. (U) FY 1993 PLANS: Initiate development of Armament Enhancement Initiative and Optical Improvement Program projects.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MCRDAC, Quantico, VA. CONTRACTORS: General Dynamic Land Systems, Warren MI.

F. (U) RELATED ACTIVITIES: Program Element 0203735A, Project Number D330.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT					
PNC P-1 #44					
M1A1 MOD KITS	0	500	500	2,000	3,000

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206623M

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Supporting Arms Systems
 PROJECT NUMBER: C1901 PROJECT TITLE: Ground Weaponry Product Improvement Program

C. (U) DESCRIPTION: This project develops joint and USMC unique improvements to infantry weapons, and monitors national/international weapons developments.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Initiated special application sniper rifle program.
- b. (U) Completed M16 Tracer, ammunition programs and modification kit for Close Quarters Battle (CQB) weapon.
- c. (U) Continued M249 Squad Automatic Weapon (SAW), M60E3 machine gun, joint Thermal Imaging System (TIS) program, and ammunition programs for frangible and light armor penetrator rounds.
- d. (U) Continue evaluation of artillery technology.
- e. (U) Continued 25mm advanced multi-purpose ammunition (AMP) effort.
- d. (U) Initiated .50 caliber anti-material/special applications scoped rifle (SASR).

2. (U) FY 1992 PROGRAM:

- a. (U) Complete special applications scoped rifle.
- b. (U) Initiate 7.62mm Designated Marksman Weapon (DMW) and continue M16 Tracer ammunition, M249 SAW, M240, 40mm Belly Attack Munition, Improved Heavy machine gun mount.
- c. (U) Continue joint Thermal Imaging System program.
- d. (U) Evaluate artillery technology.
- e. (U) Continue 25mm advanced multi-purpose ammunition program.

3. (U) FY 1993 PLANS:

- a. (U) Continue modification kits for Infantry Weapons, 7.62mm DMW development, 40mm Belly Attack Munition, Improved Heavy machine gun mount, thermal program emphasis on infantry weapons thermal sight.
- b. (U) Participate in advanced combat rifles program.
- c. (U) Evaluate artillery technology and 25mm advanced multi-purpose ammunition program.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NWSC Crane, IN; ARDEC, Dover NJ; NSWC, Dahlgren, VA; NVEOL, Ft Belvoir, VA; NWC, China Lake, CA. CONTRACTORS: TBD.

F. (U) RELATED ACTIVITIES: All ground weapons and ground ammunition systems: USA, USN, USAF, USCG, USCINCSOC.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

(U) PROCUREMENT	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
PMC P-1 #50 HK19 MG	16,936	5,185	0	0	22,121
PMC P-1 #46 Mod Kits (Artillery & Other)	0	600	5,826	CONT.	CONT.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206623M

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Supporting Arms Systems

PROJECT NUMBER: C1960 PROJECT TITLE: Light Armored Vehicle-Air Defense (LAV-AD)

C. (U) DESCRIPTION: LAV-AD develops a highly effective air defense system on an LAV chassis to provide air defense for rapidly maneuvering ground combat elements in the Marine Air Ground Task Force. The weapons system consists of a rapid fire 25mm gun and STINGER Standard Vehicle Missile Launcher (SVML). The weapons system fire control system integrates a fire control computer, laser range finder, Forward Looking Infrared Radar (FLIR), multi-mode auto-tracker, video display, optical sights, and vehicle navigation system. The system will have fire-on-the-move capability and be capable of engaging ground targets. LAV-AD conducted Full Scale Development (FSD) wherein two contractors competed during Developmental/Operational testing and submitted production proposals. A source selection process determined the production contractor.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Completed Developmental Test II (DT II).**
- b. (U) Reduced costs by down selecting from 2 contractors to 1.**

2. (U) FY 1992 PROGRAM:

- a. (U) Released Request for Proposal (RFP) in January 1992.**
- b. (U) Award contract in May 1992.**
- c. (U) Incorporation of U.S. Army beam rider STARSTREAK Missile with funds added by the Congress.**

3. (U) FY 1993 PLANS:

- a. (U) Receive prototype delivery.**
- b. (U) Conduct DT IIA/Operational Test II (OT II) and refurbishment.**

4. (U) PROGRAM TO COMPLETION:

- a. (U) Complete Full Scale Development and reach Milestone III product decision.**
- b. (U) Correct any deficiencies in Operational Test II.**
- c. (U) This program completes in FY 1996.**

E. (U) WORK PERFORMED BY: IN-HOUSE: PM-LAV TACOM, Warren, MI; NSWC Dahlgren, VA; TECOM, Aberdeen, MD; MCCDC, Quantico, VA; MCLB, Albany, GA. **CONTRACTORS:** (For the system) General Electric, Burlington, VT; FMS, San Jose, CA; (For the chassis) Diesel Division of GM, London, England and Ontario, Canada.

F. (U) RELATED ACTIVITIES: Program Element 0206623M, Project Number C1120, Pedestal Mounted STINGER.

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206624M

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Marine Corps Combat Services Support

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C0076	Combat Service Support PIP	556	105	429	CONT.	CONT.
C0085	Amphibious Raid Equipment	1,347	100	125	CONT.	CONT.
	TOTAL	1,903	205	554	CONT.	CONT.

B. (U) DESCRIPTION: This program element provides funding for Marine Air Ground Task Force requirements for combat service support equipment improvements. It also provides for evaluation of non-developmental items to support Marine Corps amphibious raid reconnaissance and special operations in low intensity conflicts in all climatic environments, as well as, improvements in Tactical Fuel Systems equipment and utilities systems items.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206624M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Combat Services Support
PROJECT NUMBER: C0076 PROJECT TITLE: Combat Service Support Product
Improvement Program (PIP)

C. (U) DESCRIPTION: This project includes but is not limited to research and development of all areas of motor transport which will increase mobility, maintainability and reliability. It also evaluates systems for improvements in operational capabilities.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Developed/tested: new suspension system for the 5-Ton truck, self loading/unloading system for the 5-Ton truck and bed-mounted crane for the 5-Ton truck.

b. (U) Improved service life of rubber products.

c. (U) Tested air starter system for the Logistics Vehicle System (LVS) and conducted extensive testing on a Special Operations Capable Vehicle.

d. (U) Completed testing on a universal pretreatment unit to be used with all water purification equipment.

e. (U) Developmental testing (DT) and operational testing (OT) were conducted on a Load Moment Indicator for the Marine Corps heavy crane and the purchase description was completed.

2. (U) FY 1992 PROGRAM:

a. (U) Develop/test: HMMV and 5-Ton vehicles weapons platforms, crane mounted/configured 5-Ton, new wrecker for 5-Ton and Central Tire Inflation System for the LVS.

b. (U) DT/OT new 5-Ton suspension system.

3. (U) FY 1993 PLANS:

a. (U) Develop/test: Contact Maintenance Vehicle and new suspension system for the LVS.

b. (U) Develop new wrecker for the LVS.

c. (U) Test Central Tire Inflation for the high mobility multi-purpose wheeled vehicle (HMMV), chassis mounted cranes for the 5-Ton, and various weapons platforms for the HMMV and 5-Ton vehicles.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: The Marine Corps Motor Transport Test Site, Quantico, VA. CONTRACTORS: National Automotive Test Center, Carson City, NV; AAI Corporation, Cockeysville, MD; Teledyne, Muskegon, MI; Chrysler, Detroit, MI.

F. (U) RELATED ACTIVITIES: NONE.

G. (U) OTHER APPROPRIATION FUNDS: NONE.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206624M

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Marine Corps Combat Services Support

PROJECT NUMBER: C0085 PROJECT TITLE: Amphibious Raid Equipment

C. (U) DESCRIPTION: This project will ultimately field items of equipment which are mission peculiar to the Marine Air Ground Task Force special operations capability. Initiatives are predominantly low cost Non-developmental Items (NDI). Principal requirements are for: Reconnaissance Patrolling, Insertion and Extraction (R-PIE); Diving Equipment Enhancement Program (DEEP); Airborne Capability Enhancement (ACE); Direct Action Equipment Enhancement (DAEE) and Family of Boats (FOB). These requirements enhance mission capability by reducing weight, eliminating equipment redundancies, ensuring compatibility of individual items of equipment and increasing the utility of equipment.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Reached MS III for the Riverine Assault Craft (RAC).
- b. (U) Began and completed Field User Evaluation (FUE) for many items, to include: Anti-Exposure Dry Suit, Assault Breachers Kit and Hazardous Material Gas Mask.
- c. (U) Fielded the surface swimmers set, Open Circuit Diving Equipment, MP-5 sub-machine guns, Anti-Material Sniper Rifles, Diving Dry Suits, Diving Safety Boats, and Solar Panels.

2. (U) FY 1992 PROGRAM:

- a. (U) Test insertion, extraction and resupply items of equipment for R-PIE.
- b. (U) Begin procurement of RAC.
- c. (U) Evaluate the Trans-Recompression Chamber.

3. (U) FY 1993 PLANS:

- a. (U) Test new R-PIE items based on technology advances.
- b. (U) New items as required will be added to the R-PIE ROC.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MARCORSYSOON, Quantico, VA. CONTRACTS: NONE.

F. (U) RELATED ACTIVITIES: NONE.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands):

(U) PROCUREMENT	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
PMC Line 108					
Amphib Raid Eq	7,212	616	547	CONT.	CONT.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206625M

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Marine Corps Intelligence/Electronics Warfare Systems

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C0062	IAS	7,960	5,021	2,139	991	26,068
C1296	JSIPS	13,064	14,444	9,538	8,531	104,419
C1297	TRSS	2,170	2,612	3,446	CONT.	CONT.
C1928	TERPES	10,043	6,052	7,715	CONT.	CONT.
	TOTAL	33,237	28,129	22,838	CONT.	CONT.

B. (U) DESCRIPTION: This program element funds the operational systems development of Marine Corps intelligence equipment that will complement current and future sensors and will provide systems for data evaluations required to support the operating forces into the next century. Tactical Electronic Reconnaissance Processing and Evaluation System (TERPES) provides an Electronic Intelligence (ELINT) fusion capability for the Marine Air Ground Intelligence System (MAGIS).

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206625M BUDGET ACTIVITY: 4
 PROGRAM ELEMENT TITLE: Marine Corps Intelligence/Electronics Warfare Systems
 PROJECT NUMBER: C0062 PROJECT TITLE: Intelligence Analysis Systems (IAS)

C. (U) DESCRIPTION: The IAS program uses an evolutionary acquisition strategy and Non-Development Items of hardware and software to product improve the AN/TYQ-19 Intelligence Analysis Center (IAC), a fielded Marine Expeditionary Force (MEF) asset. The program consists of overlapping sequential block upgrades.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Completed intermediate software development.
- b. (U) Published a production request for proposal (RFP) for echelons below the MEF (intermediate IAS) level.
- c. (U) Began incorporation of tactical theater and national level data bases and interfaced with other Marine Air Ground Intelligence Systems (MAGIS) components.
- d. (U) Reduced costs by integrating Tactical Electronic Reconnaissance Processing and Evaluation Systems (TERPES) software.
- e. (U) Incorporated Defense Intelligence Agency's (DIA's) Integrated Database System (IDS).

2. (U) FY 1992 PROGRAM:

- a. (U) Continue software integration for other systems interface and communication.
- b. (U) Conduct Follow-on Test and Evaluation on IAC upgrade.

3. (U) FY 1993 PLANS: Incorporate Secondary Imagery Dissemination.

4. (U) PROGRAM TO COMPLETION:

- a. (U) Develop software for MEF/Marine Expeditionary Brigade (MEB) and individual workstation systems.
- b. (U) This program completes research and development in FY 1994.

E. (U) WORK PERFORMED BY: IN-HOUSE: NWSC, Crane, IN; MCTSSA, Camp Pendleton, CA; Point Mugu, Oxnard, CA. CONTRACTORS: Atlantic Research Corp., Dumfries, VA; Columbia Research Corp., Dumfries, VA, TRW Fairfax, VA.

F. (U) RELATED ACTIVITIES: Defense Intelligence Agency.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands):

(U) PROCUREMENT	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
PNC P-1 # 80 IAS	0	4,021	5,388	0	9,676

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206625M

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Marine Corps Intelligence/Electronics Warfare Systems

PROJECT NUMBER: C1296 PROJECT TITLE: Joint Service Imagery Processing System (JSIPS)

C. (U) DESCRIPTION: The JSIPS mission is to acquire and exploit multi-sensor digital imagery in near-real time from national, theater, and tactical platforms, in a soft copy format. JSIPS is not designed to counter a specific enemy threat. The JSIPS will replace the current Imagery Interpretation and Imagery Processing Sub-systems of the Marine Air Ground Intelligence System which only have the capability of analyzing visible spectrum hard copy. The soft copy imagery, linked, digital data, exploitation capability of the JSIPS becomes a critical requirement with the replacement of the RF-4B aircraft with the F/A-18D reconnaissance aircraft and the mid range Unmanned Air Vehicle (UAV).

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Conducted testing of Full Scale Development model.
- b. (U) Army began testing of their national input Sub-system of JSIPS in the first quarter of 1991, USMC/USAF Tactical Input Sub-System of JSIPS testing began in the third quarter of FY 1991.

2. (U) FY 1992 PROGRAM:

- a. (U) JSIPS passed Defense Intelligence Agency (DIA) Security Accreditation in the first quarter of FY 1992.
- b. (U) JSIPS completed Environmental and Mobility testing at Aberdeen Proving Grounds in the first quarter of FY 1992.

3. (U) FY 1993 PLANS:

- a. (U) Complete Developmental Testing (DT) and Operational Testing and Evaluation (OT&E) in the second quarter of FY 1993.
- b. (U) Deliver USMC 10 foot shelter sized National Input Segment in the first quarter of FY 1993.
- c. (U) Achieve MS III decision in the fourth quarter of FY 1993.

4. (U) PROGRAM TO COMPLETION:

- a. (U) Operational Testing deficiency corrections.
- b. (U) Pre-planned product improvements.
- c. (U) This program completes in FY 1997.

E. (U) WORK PERFORMED BY: IN-HOUSE: ESD, Hanscom AFB, MA. CONTRACTORS: E-Systems, Garland, TX. GTE/CONTEL, West Lake Village, CA.

F. (U) RELATED ACTIVITIES: NONE.

G. (U) OTHER APPROPRIATION FUNDS: NONE.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206625M **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Marine Corps Intelligence/Electronics Warfare Systems
PROJECT NUMBER: C1297 **PROJECT TITLE:** Tactical Remote Sensor System (TRSS)

C. (U) DESCRIPTION: This project develops replacement data packages for re-procurement of the year 1972 inventory items. The system is a remote unattended ground sensor set capable of detecting and providing essential intelligence to the Marine Corps Air Ground Intelligence System during tactical pre-assault, assault, and post assault operations. The program structure follows an evolutionary acquisition concept that allows for the development, production, and fielding of a basic capability, followed by incremental developments and procurement that will ensure a full capability. The basic capability is now in full rate production.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Continued integrated logistic support (ILS) documentation.
- b. (U) Continued development of non-real time components.
- c. (U) Completed air certification for the air components required for initial fielding.
- d. (U) Continued modular software improvements.
- e. (U) Conducted factory training for initial fielding.
- f. (U) Conducted Full Field verification.
- g. (U) Conducted First Article Tests and Operational Evaluation with FMF units.
- h. (U) Started development of night capable discrimination/classification device.

2. (U) FY 1992 PROGRAM:

- a. (U) Initial Operational Capability (IOC) of initial suite of basic sensors, monitors, and relays.
- b. (U) Continue ILS documentation to support various product improvements.
- c. (U) Complete development of airborne relay and initiate procurement.
- d. (U) Complete development of night capable discrimination/classification device and continue software upgrades in ADA.

3. (U) FY 1993 PLANS:

- a. (U) Continue ILS documentation to support various product improvements.
- b. (U) Complete Air Certification of Air Replaced devices on the F/A-18.
- c. (U) Initiate development of advanced capability sensors. (Nuclear/Chemical/Biological, airfield activity sensors and urban/covert deployable).
- d. (U) Continue software upgrades for advanced mission planning.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. WORK PERFORMED BY: IN-HOUSE: Naval Avionics Center, Indianapolis, IN; Naval Air Development Center, Warminster, PA. **CONTRACTORS:** NITECH Inc., Quantico, VA.

F. (U) RELATED ACTIVITIES: NONE.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)					
	FY 1991	FY 1992	FY 1993	TO	TOTAL
(U) PROCUREMENT	ACTUAL	ESTIMATE	ESTIMATE	COMPLETE	PROGRAM
PNC P-1 #80 TRSS	4,327	17,052	17,934	CONT.	CONT.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206625M

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Marine Corps Intelligence/Electronics Warfare Systems

PROJECT NUMBER: C1928 PROJECT TITLE: Tactical Electronic Reconnaissance Processing and Evaluation System (TERPES)

C. (U) DESCRIPTION: This system is a segment of the Marine Air Ground Intelligence System (MAGIS). It provides Electronic Intelligence (ELINT) collected from aviation reconnaissance assets. The system processes this intelligence to locate and identify enemy emitters.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Completed integration of Military Integrated Intelligence Data System - Intelligence Data Base (MIIDS IDB) with SYBASE.
- b. (U) Completed development of EA-6B datalink with TERPES.
- c. (U) Completed integration with the tactical communications center.
- d. (U) Two TERPES were deployed to South West Asia (SWA) in direct support of Operation Desert Shield/Storm.

2. (U) FY 1992 PROGRAM:

- a. (U) Begin development of the full Department of Defense Integrated Intelligence System (DODIIS) and System High Capability.
- b. (U) Begin integration with Advanced Tactical Air Command Central (ATACC) datalink requirements.
- c. (U) Begin integration with Joint Service Imagery Processing System (JSIPS) communication links to include Tactical Air Data Information Link Capability (TADIL).
- d. (U) Begin Integration with the Tactical Information Broadcast Service (TIBS).

3. (U) FY 1993 PLANS:

- a. (U) Continue development of full DODIIS and System High Capability.
- b. (U) Continue integration of ATACC datalink requirements.
- c. (U) Continue integration of JSIPS communication links and TADIL capabilities.
- d. (U) Continue integration of TIBS.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: PMTC, Point Mugu, CA; NAVAIR, Washington, DC. CONTRACTORS: Lockheed, Austin, TX; TRW Vienna, VA; ETA Technologies, Stafford, VA.

F. (U) RELATED ACTIVITIES: Program Element 0206625M, Marine Corps Intelligence Systems, (Operational Systems) C0062, Intelligence Analysis Center (IAC), Tactical Remote Sensor System (TRSS).

G. (U) OTHER APPROPRIATION FUNDS:

(U) PROCUREMENT	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
PMC P-1 #81					
AN/TSQ-90 TERPES	3,876	1,297	250	2,340	7,763

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206626M

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Marine Corps Command/Control/Communications Systems

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C0045	TACSIIP	11,713	3,250	3,039	CONT.	CONT.
C0103	MACCS OPS DEV	2,990	99	526	CONT.	CONT.
C1067	AVIATION RADAR PIP	2,608	4,085	0	6,091	53,297
C1443	TRNG DEVICE/SIM (ENG)	2,841	2,313	2,427	2,223	30,165
C2035	PLRS/NAVSTAR/GPS	2,469	1,041	3,595	CONT.	CONT.
C2102 ¹	IDASC	0	1,203	1,006	989	3,198
C2122 ²	TCO	0	6,730	2,842	CONT.	CONT.
	TOTAL	22,621	18,721	13,435	CONT.	CONT.

¹ FY 1991 funding under Project C0103.

² FY 1991 funding under Project C0045.

B. (U) DESCRIPTION: This program provides funding to ensure the inter/intraoperability of tactical command, control, communications, computers, and intelligence systems required by the Marine Corps and the Department of Defense.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206626M **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Marine Corps Command/Control/Communications Systems
PROJECT NUMBER: C0045 **PROJECT TITLE:** Tactical Systems Inter/
Intraoperability Program (TACSIIP)

C. (U) DESCRIPTION: This program ensures the inter/intraoperability of tactical command, control, communications, computers, and intelligence systems to the extent required by the Marine Corps and the Department of Defense. Tactical Combat Operations (TCO) funding was transferred to Project C2122 in this Program Element in FY 1992. FY 1991 accomplishments for the TCO program are discussed in Project C2122.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Continued with the development and maintenance of the Interoperability Database System (IDBS).
- b. (U) Continued systems engineering support/configuration management for the maintenance/update of the Marine Tactical Systems Technical Interface Design Plan (MTS TIDP), Marine Tactical Communications Architecture (MCTCA) near term, the Marine Air Ground Task Force (MAGTF) Interoperability Requirements Concepts (MIRC), and military telecommunications standards.
- c. (U) Continued the development of MTS Interoperability Test Set (MITS).
- d. (U) Published the MCTCA, mid-term and Volume II of the MTS TIDP.

2. (U) FY 1992 PROGRAM:

- a. (U) Continue with the maintenance of the IDBS.
- b. (U) Proceed with revisions to the MIRC, MTS TIDP, and the mid-term MCTCA.
- c. (U) Continue to support the development of military telecommunications standards and USMC telecommunications modelling.
- d. (U) Continue to develop MITS and begin interoperability testing and certification of USMC C4I systems for MTS TIDP compliance.
- e. (U) Continue support to NATO and DoD working/steering groups.
- f. (U) Continue system engineering services to Deputy Program Managers (DPMs) for Marine Corps Joint Telecommunications standards.

3. (U) FY 1993 PLANS:

- a. (U) Maintain/update the IDBS.
- b. (U) Continue configuration management of Marine Tactical Air Command and Control System (MTACCS) configuration items.
- c. (U) Continue to support the development of military telecommunications standards.
- d. (U) Continue interoperability testing and certification of USMC C4I.
- e. (U) Continue intraoperability testing of Digital Communications Terminal (DCT), Tactical Air Operations Module (TAOM), Unit Level Circuit Switch (ULCS) data module, Improved Direct Air Support Center (IDASC) and Advanced Field Artillery Tactical Data System (AFATDS).
- f. (U) Continue system engineering support for Marine Corps and Joint Telecommunications standards.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MARCORSYSOM and MCCDC, Quantico, VA; MCTSSA, MCB, Camp Pendleton, CA. **CONTRACTORS:** LOGICON-Eagle Technology, Inc., Dumfries, VA; NSR Corp., Colorado Springs, CO.

F. (U) RELATED ACTIVITIES: Marine Corps Tactical C4I systems.

G. (U) OTHER APPROPRIATION FUNDS: NONE.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206626M

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Marine Corps Command/Control/Communications Systems

PROJECT NUMBER: C0103 PROJECT TITLE: Marine Air Command and Control
Systems Operational Development
(MACCS OPS DEV)

C. (U) DESCRIPTION: This project supports the Air Command and Control Systems for Marine Corps and Joint/Allied interoperability and compatibility. Preliminary designs for physical and functional enhancements were approved and prototype hardware developed. Studies were conducted to determine the scope of data to be processed in the Improved Direct Air Support Center (IDASC) and candidate software and hardware upgrades were reviewed. IDASC was transferred to Project C2102 in this Program Element in FY 1992.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Continued software modification to IDASC.
- b. (U) An additional prototype was built and suitability testing conducted.
- c. (U) Continued to develop the KG-84 modification to the Tactical Air Operations Module (TAOM) AN/TYQ-3A.
- d. (U) Fielded Version R of the AN/TYQ-3A software.

2. (U) FY 1992 PROGRAM: Sustained low level of effort planning modifications resulting from anticipated late delivery of Tactical Air Operations Modules.

3. (U) FY 1993 PLANS: Continue to correct interoperability problems which arise with the fielding of Tactical Air Operations Modules and performance envelope deficiencies identified as TAOM undergoes joint testing with the U.S. Air Force Maneuver Control Equipment.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MARCORSYSCOM, Quantico, VA; MCTSSA, Camp Pendleton, CA; NAVELEX, Vallejo, CA. CONTRACTORS: Litton, Van Nuys, CA.

F. (U) RELATED ACTIVITIES: US Air Force Modular Control Equipment and New Mobile Radar Approach Control.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

(U) PROCUREMENT	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
TAOM	31,548	27,000	0	0	112,578

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206626M **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Marine Corps Command/Control Communications Systems
PROJECT NUMBER: C1443 **PROJECT TITLE:** Training Devices/Simulators
(Engineering) Program

C. (U) DESCRIPTION: Marine Air Ground Task Force (MAGTF) Tactical Warfare Simulation (MTWS) is a product improvement for the Tactical Warfare Simulation, Evaluation and Analysis System (TWSEAS). MTWS is a tactical command and control training system for the MAGTF commander and his staff which will provide realistic tactical training through wargaming.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Completed Software Requirements and Analysis Phase by successfully concluding Software Design Review (functional baseline) and subsequently, Software Specification Review (allocated baseline).

b. (U) Concluded Preliminary Design Review after deliberate Formal Inspection and proceeded into Detailed Design Phase. (Scope of effort expansion, inclusion of man-machine interface into initial effort required more expansive requirements phase and schedule adjustments).

2. (U) FY 1992 PROGRAM:

a. (U) Complete Detailed Design Phase by successfully conducting Critical Design Review.

b. (U) Proceed into software coding phase.

3. (U) FY 1993 PLANS:

a. (U) Complete coding/testing phases, followed by conduct of final Qualification Test and initial site (1st Marine Expeditionary Force (I MEF)) installation and testing.

b. (U) Procure all sites hardware to support developed software.

4. (U) PROGRAM TO COMPLETION: This program completes the research and development phase in FY 1994; however, evolving software block upgrades are anticipated.

E. (U) WORK PERFORMED BY: IN-HOUSE: Naval Ocean Systems Center (NOSC), San Diego, CA. **CONTRACTORS:** Systems Exploration Inc., San Diego, CA.

F. (U) RELATED ACTIVITIES: Formal agreement with US Navy for interface with the OPNAV-73 sponsored "Naval Wargaming System."

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

(U) PROCUREMENT	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
PMC #117 MTWS	0	0	2,105	0	2,105

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206626M

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Marine Corps Command/Control/Communications Systems

PROJECT NUMBER: C2035 **PROJECT TITLE:** PLRS PIP/NAVSTAR/GPS

C. (U) DESCRIPTION: The Position Location Reporting System Product Improvement Program (PLRS PIP) consists of a Downsized Master Station (DSMS), the PLRS Communication Enhancement (PCE) and the Global Positioning System Interface Unit (GPSIU). DSMS requires a four year development effort with production in FY 1997. PCE is a three year development effort with production in FY 1995. GPSIU is a 2 year development effort with production in FY 1994. GPS is a two year test with Non-Developmental Item (NDI) procurement in FY 1994.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Entered into a cooperative effort with the Army and Navy to rewrite the current CMS-2 software into ADA for application with DSMS.

b. (U) Development of PCE and GPSIU continued.

c. (U) Continued performing Demonstration/Validation of various GPS receivers.

2. (U) FY 1992 PROGRAM:

a. (U) Pre-contract preparation for the DSMS.

b. (U) Continue development of Handheld GPS Receivers.

c. (U) Continue development of PCE.

3. (U) FY 1993 PLANS:

a. (U) Award DSMS research and development contract.

b. (U) Begin operational testing of GPS Receivers.

c. (U) Continue development of PCE.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: GPSIU: NADC, Warminster, PA; MCTSSA, Camp Pendleton, CA; GPS Joint Program Office, Los Angeles Air Force Base, Los Angeles, CA. DSMS: MCTSSA, Camp Pendleton, CA; CECOM, Ft Monmouth, NJ. CONTRACTORS: DSMS and PCE: Hughes Aircraft Company, Fullerton, CA.

F. (U) RELATED ACTIVITIES: A cooperative effort in software rewriting with the Army and Navy is underway.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

(U) PROCUREMENT	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
GPS HANDHELD RECEIVER	0	934	898	7,923	9,825
PLRS SVIK	4,162	7,900	0	0	12,062

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206626M

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Marine Corps Command/Control/Communications Systems

PROJECT NUMBER: C2102 **PROJECT TITLE:** IDASC

C. (U) DESCRIPTION: The current Improved Direct Air Support Center (IDASC) will be upgraded to include physical/functional enhancements and a digital data interface to associated command and control (C2) systems. Improvements include digital mapping display and information overlay, communications processing and data base manipulation. Preliminary designs for physical and functional enhancements were approved and prototype hardware developed. Work will continue on review and modification of off-the-shelf software and selection of prototype hardware as well as determining software baselines and prioritizing system upgrades. FY 1991 development funds were contained in this Program Element under Project C0103 Marine Air Command and Control Systems.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Continued software modification.
- b. (U) Built prototype.
- c. (U) Conducted suitability testing.

2. (U) FY 1992 PROGRAM:

a. (U) Downsized DASC baseline and incorporate previous hardware and software upgrades into highly mobile Standard Integrated Command Post (SICP) shelters on high mobility multi-purpose wheeled vehicles (HMWVs).

b. (U) Continue block upgrades to the software program including communications interfaces to Tactical Combat Operations - Multi-Service Advanced Field Artillery Tactical Data System (TCO-MAFATDS).

3. (U) FY 1993 PLANS: Continue upgrading system software to include compatibility with all external command and control agencies.

4. (U) Program to completion:

- a. (U) This program completes in FY 1994.
- b. (U) Technological upgrades will continue as required to ensure compatibility with external command and control agencies.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVELEXCEN, Vallejo, CA; MCTSSA, Camp Pendleton, CA. **CONTRACTORS:** NONE.

F. (U) RELATED ACTIVITIES: NONE.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

(U) PROCUREMENT	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
PMC #70 IDASC	0	3,264	2,800	2,370	8,434

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0206626M

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Marine Corps Command/Control/Communications Systems

PROJECT NUMBER: C2122 **PROJECT TITLE:** Tactical Combat Operations (TCO)

C. (U) DESCRIPTION: TCO is the focal point of Marine Air Ground Task Force (MAGTF) command and control (C2). It will provide the automation required by MAGTF and subordinate commanders for the receipt, fusion, display and dissemination of selective input from the other C2 systems. TCO will become the fusion center of the Marine Tactical Command and Control Systems (MTACCS). TCO integrates the Advanced Tactical Air Command Central (ATACC), Intelligence Analysis System (IAS), Improved Direct Air Support Center (IDASC) and Marine Integrated Personnel System (MIPS). Evolutionary design tested by the Field Development Systems (FDS) integrates all systems residing under this program through further design and hardware selection. FY 1991 funds were contained in this Program Element under Project C0045 Tactical Systems Inter/ Intraoperability Program (TACSIIP).

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Defined TCO systems engineering and acquisition strategy to deploy a baseline TCO system which provides for the integration of associated MTACCS systems such as Marine Air Command and Control Systems (MACCS), IAS, and MIPS/Marine Integrated Logistics System (MIPS/MILOGS).

b. (U) Conducted FDS demonstration in February 1991.

c. (U) Fleet Marine Force input will refine direction for FDS-2.

2. (U) FY 1992 PROGRAM:

a. (U) Marine Corps Research, Development and Acquisition Command (MCRDAC) teamed with 7th Marine Expeditionary Brigade for FDS-1 evaluation November 1991.

b. (U) TCO completes Milestone I in the third quarter.

c. (U) Contracts for selected hardware are initiated.

d. (U) Requirements identified in FDS-1 are addressed through further software design and FDS-2 is the baseline to test improvements, new design and interoperability.

3. (U) FY 1993 PLANS: Conduct FDS-2 testing with the partial integration of all other command and control systems.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: C2G, MCTSSA, MCB, Camp Pendleton, CA. **CONTRACTORS:** Pacific Northwest Labs, Seattle, WA; Command Systems Incorporated, Fort Wayne, IN; TRW, Los Angeles, CA.

F. (U) RELATED ACTIVITIES: All projects in this Program Element.

G. (U) OTHER APPROPRIATION FUNDS: NONE.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0208010M

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Joint Tactical Communications Program (TRI-TAC)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C0049	ULS	920	300	336	CONT.	CONT.
C0065	COMMCON	1,160	369	513	CONT.	CONT.
	TOTAL	2,080	669	849	CONT.	CONT.

B. (U) DESCRIPTION: This program element provides for development of the Joint Unit Level Switches (ULS) and supporting equipments. Equipments developed within this program element support the mission area of command and control and specifically support the switching requirements of the various subsystems within the Marine Corps Tactical Communications Architecture. The Assistant Secretary of Defense for Command, Control, Communications and Intelligence (ASD, C3I) has designated the Marine Corps as the developing service for ULS and the ASD provides oversight for Marine Corps testing of Joint Tactical Command, Control and Communications Program equipments. The ULS project consists of product improvements to the Unit Level Circuit Switch (ULCS), Unit Level Tactical Data Switch (ULTDS), and their peripheral equipment. The Communications Control (COMMCON) project involves development in the areas of Systems Planning and Engineering (SPE), Operational Systems Control (OSC), and Technical Control (TECHCON) required to deploy, operate, refurbish and retrofit the Marine Corps tactical communications systems. The program also contains funds to support Marine Corps Joint Tactical Communications Program (JTCP) Testing.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0208010M

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Joint Tactical Communications Program (TRI-TAC)

PROJECT NUMBER: C0049 PROJECT TITLE: Unit Level Switches (ULS)

C. (U) DESCRIPTION: The Unit Level Circuit Switch (ULCS) and Unit Level Tactical Data Switch (ULTDS) provide the backbone of the digital communications architecture within the Marine Corps. This project provides software improvements to support incorporation of ULTDS into the ULCS switches.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Evaluated user inputs arising from use of ULCS equipment in Operations Desert Shield and Desert Storm.

b. (U) In response to calls for increased capacity for the Tactical Telephone Communication (TTC)-42 (150 line switch), a software engineering change was placed under contract to increase TTC-42 capacity to 280 lines.

c. (U) Retrofit of all ULCS switches was completed to incorporate hardware and software upgrades which significantly improve ULCS interoperability with Army and Air Force TTC-39 switches and Army Mobile Subscriber Equipment (MSE) switches.

d. (U) Extensive software work was accomplished in preparation for incorporation of a Packet Data Switching capability into the TTC-42 and SB-3865 switches.

e. (U) Started work to improve radio-telephone access to the switched network by further development of automated net radio interface equipment.

2. (U) FY 1992 PROGRAM: Continue software improvements to integrate Packet Switch and Circuit Switch software into a single package for each of the ULCS switches (TTC-42 and SB-3865).

3. (U) FY 1993 PLANS:

a. (U) Continue integration of ULTDS and ULCS software packages with emphasis on fully documenting software improvements completed to date.

b. (U) Support Marine Tactical Command and Control System development with continued maintenance of AN/GYC-7 packet switch engineering design models.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MARCORSYSOON, Quantico, Va. CONTRACTORS: Atlantic Research Corporation, Rockville, MD; ITT Aerospace/Defense Communications Division, Nutley, NJ.

F. (U) RELATED ACTIVITIES: Program Elements 0208010A and 0208010F, both titled Tri-Service Joint Tactical Communications Program.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

(U) PROCUREMENT	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
PNC #64	33,038	12,568	7,088	2,704	103,558

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0208010M

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Joint Tactical Communications Program (TRI-TAC)

PROJECT NUMBER: C0065 PROJECT TITLE: Communications Control (COMMCON)

C. (U) DESCRIPTION: The COMMCON project consists of three acquisition areas: (1) Systems Planning and Engineering (SPE), (2) Operational Systems Control (OSC) and (3) Technical Control (TECHCON). These functions are required to deploy, operate, and retrofit Marine Corps tactical communications systems. The System Planning, Engineering, and Evaluation Device (SPEED) is a micro-computer system which supports Marine Corps tactical communications systems planning, engineering, and evaluation processes. SPEED maximizes the utility of tactical communications systems. This project supports Joint Tactical Communications Program (JTCP) testing.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) SPEED acquired more capabilities for tactical automated switch network planning, multichannel radio frequency deconfliction, communications equipment interconnection, compatibility analysis, automated Communications-Electronics Operating Instructions (CEOI), co-site analysis, communications satellite planning, communications annex generation, and a plans data base.

b. (U) Fielded SPEED to operational Marine Corps Forces in the third quarter of FY 1991.

2. (U) FY 1992 PROGRAM:

a. (U) Continue the Pre-Planned Product Improvement (P3I) program to incorporate hardware/software interoperability with emerging technologies.

b. (U) Also address the evolution of SPEED to evolve and integrate into the functional areas of systems control and technical control.

3. (U) FY 1993 PLANS:

a. (U) Continue the Pre-Planned Product Improvement program to incorporate hardware/software interoperability with emerging technologies.

b. (U) Continue the evolution of SPEED into the areas of OSC and TECHCON.

4. (U) PROGRAM TO COMPLETION: This is a continuing program

E. (U) WORK PERFORMED BY: IN-HOUSE: ECAC, Annapolis, MD, and Tobyhanna Army Depot, PA. CONTRACTORS: Atlantic Research Corporation, Rockville, MD and Eagle Technology, Orlando FL.

F. (U) RELATED ACTIVITIES: Program Elements 0208010A, 0208010F, both titled Tri-Service Joint Tactical Communications Program.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT					
ADP (SPEED)	0	1,304	0	0	1,304

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

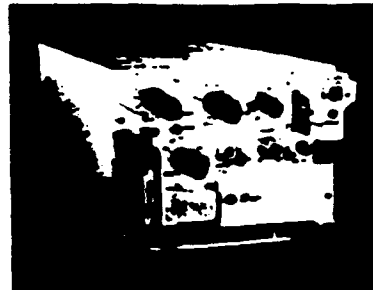
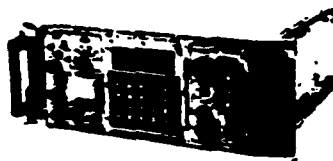
PROGRAM ELEMENT: 0303109N

BUDGET ACTIVITY: 5

PROGRAM ELEMENT TITLE: SATELLITE COMMUNICATIONS

PROJECT NUMBER: X0731

PROJECT TITLE: FLEET SATELLITE COMMUNICATIONS



POPULAR NAME: SATCOM

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program	TADIXS Phase IV Mini-DAMA			
Milestones	OTCIKS II IOC 8/92 MS III 9/93			TACINTEL II IOC 4Q/94
	TACINTEL II MS II 9/92			Mini-DAMA (V)1 IOC 3Q/95
				(V)3 IOC 1Q/97
Engineering	Mini-DAMA	Mini-DAMA	Tacintel II Pro-	
Milestones	PDR 6/91	CDR 3/92	tototype Demo 10/92	
T&E	Mini-DAMA (V)1			Mini-DAMA (V)3
Milestones	DT II 9/92			OT II 4Q/94
				Mini-DAMA (V)3
				DT II 1Q/93
				Universal Modem
				DT II 2Q/94; OT II 1Q/95
				TACINTEL II
				DT IIA 2Q/94; DT IIB 1Q/96
				OTA II 3Q/94; OT IIB2Q/96

Contract Milestones

BUDGET (\$K)	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
Major Contract	13,049	22,535	22,178	Continuing Continuing
Support Contract	544	3,456	3,032	Continuing Continuing
In-House Support	2,348	4,568	3,823	Continuing Continuing
GFE/Other	48	171	155	Continuing Continuing
Total	15,989	30,730	29,188	Continuing Continuing

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0303109M BUDGET ACTIVITY: 5
 PROGRAM ELEMENT TITLE: Satellite Communications
 PROJECT NUMBER: X0731 PROJECT TITLE: Fleet Satellite Communications

B. (U) DESCRIPTION:

(U) Fleet Satellite Communications provide the backbone of Naval communications worldwide. It employs six communications satellite systems: Fleet Satellite (FLTSAT) Communications, Leased Satellite (LEASAT) Communications, Defense Satellite Communication System (DSCS), Ultra High Frequency Follow-On (UFO) satellite, NATO Allied system, and Air Force Satellite Communications (AFSATCOM). System missions include providing global, continuous, secure communications among U.S. and Allied Forces, providing secure and anti-jam communication between joint command centers and fleet commanders using DSCS satellites, and providing fleet broadcast service to all Navy ships, Over-The-Horizon Targeting data for TOMAHAWK and flag configured ships, submarine communications, intelligence data, and various other battle group and joint task force communications services.

(U) The Miniature Demand Assigned Multiple Access (Mini-DAMA AN/USC-42(V)) system will provide the same satellite channel utilization efficiencies for aircraft and submarines that are now enjoyed by surface ships and shore stations equipped with the larger version TD-1271 DAMA multiplexer. Mini-Dama is being developed in three versions. The (V)1 is the submarine ship/shore application, (V)2 updates (V)1 with automatic operation, and (V)3 is the airborne application.

(U) The Tactical Data Information Exchange Subsystem (TADIXS) serves as the primary shore-to-ship communication link for providing over-the-horizon targeting data to TOMAHAWK missile equipped ships and Ocean Surveillance Products to all ships. TADIXS Phase IV provides world-wide connectivity and interoperability through gateways at major Naval communications stations.

(U) Officer in Tactical Command Information Exchange Subsystem (OTCIIX) Phase II software will be developed to provide OTCIIX Battle Group command and control data on a DAMA channel on the satellite. Sending OTCIIX data on DAMA frees valuable satellite channels for other fleet operational use.

(U) The Tactical Intelligence Information Exchange Subsystem Phase II (TACINTEL II) implements the Integrated Special Intelligence Communications (INSICOM) portion of the Copernicus architecture to provide services for transfer of Special Intelligence (SI) information between ships, aircraft, and shore activities in support of joint and combined operations. TACINTEL II will provide real time indications and warning support to joint and component commanders through reliable high speed transfer of sensor data and intelligence information. Enhanced interoperability with other services, agencies, and allies will permit a level of integration of SI operations not achievable with current systems.

(U) The SHF terminals operate within the Defense Satellite Communication System. SHF provides high capacity Anti-Jam/Low Probability of Intercept (AJ/LPI) communications to major combatants and provides Navy connectivity to Allied and Joint Force Command Networks via the DSCS. The Universal Modem is a joint U.S./U.K. development to provide U.S. and Allied interoperability for command and control networks over SHF circuits.

FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0303109N

BUDGET ACTIVITY: 5

PROGRAM ELEMENT TITLE: Satellite Communications

PROJECT NUMBER: X0731 PROJECT TITLE: Fleet Satellite Communications

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:
 - a. (U) Completed Mini-DAMA PDR
 - b. (U) Awarded Universal Modem development contract (U.S. Army lead)
2. (U) FY 1992 PROGRAM:
 - a. (U) Conduct Mini-DAMA CDR for RMD
 - b. (U) IOC TADIXS Phase IV and OTCIXS II
 - c. (U) Start DT II for the AN/USC-42(V)1 Mini-DAMA
 - d. (U) TACINTEL II system definition.
 - e. (U) Prototype of critical functions of Link protocols and media sharing for TACINTEL II
 - f. (U) Continue Universal Modem development
3. (U) FY 1993 PLANS:
 - a. (U) TADIXS Phase IV FOC and OTCIXS II FOC
 - b. (U) Mini-DAMA Milestone III for (V)1
 - c. (U) Conduct Mini-DAMA DT II for (V)3 and OT II for (V)1
 - d. (U) TACINTEL II prototype demo
 - e. (U) TACINTEL II competitive award of subcontracts for integration of system components
4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: In-house: NAVOCEANSYSCEM, San Diego, CA; NAVELEXSYSENGACT, St. Inigoes, MD; NAVELEXSYSENGCEN, Vallejo, CA; NAVELEXSYSENGCEN, Charleston, SC; NUSC, New London, CT. Contractors: Advanced Digital Systems, Inc, San Diego, CA; MA/COM, San Diego, CA; Computer Science Corporation, Falls Church, VA; Advanced Communication Systems, Inc., Arlington, VA; Scientific Research Corp., Atlanta, GA; Klien & Stump Inc, Arlington, VA.

E. (U) COMPARISON WITH FY 1992/93 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: None
2. (U) SCHEDULE CHANGES: Mini-DAMA AN/USC-42(V)1 accelerated IOC from 1Q/97 to 3Q/95.
3. (U) COST CHANGES: \$4.5M decrease is the result of pricing adjustments and the financing of other intelligence related communication efforts.

F. (U) PROGRAM DOCUMENTATION:

JOR H-C123-75 (DAMA) dtd 1/86
OR 174-094-87 (MINI-DAMA) dtd 8/87

OR 104-094-89 (TACINTEL II) dtd 7/87
TEMP 252-8 (OTCIIXS)
TEMP 252-10 (MINI-DAMA) 12/88

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0303109N **BUDGET ACTIVITY:** 5
PROGRAM ELEMENT TITLE: Satellite Communications
PROJECT NUMBER: X0731 **PROJECT TITLE:** Fleet Satellite Communications

G. (U) RELATED ACTIVITIES:

1. (U) Universal Modem. Develop network concept incorporating Universal Modem System equipment and associated network management. Provide technical coordination with Defense Communications Electronics Command (DCEC) and Communications Electronics Command (CECOM) ensuring interoperability.
2. (U) Mini-DAMA. The Navy DAMA Program; EMUT (PE# 0303142A, Title: Satellite Communications Ground Environment), the Army DAMA Program; and USTS (PE# 0303605F, Title: Ground Mobile Forces), the Air Force DAMA Program are all building interoperable DAMA terminals.
3. (U) Operational Intelligence Processor (OPINTEL) upgrade (NSA) (PE# NSA 31055, Title: Project Embroidery), High Speed Fleet Broadcast (Navy) (PE# 0204163N, Title: Communications Automation), and Navy EHF Satellite Program (Navy) are providing building blocks that complete the INSICOM architecture when combined with TACINTEL II developments.

H. (U) OTHER APPROPRIATION FUNDS:

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN*	37,687	60,684	68,789	CONT.	CONT.

* Includes UHF and SHF Procurement and installation costs identified in SATCOM Ship Terminals (P-1# 118) and SATCOM Shore Terminals (P-1# 119) funding lines.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) TEST AND EVALUATION DATA: Initiate development testing FY92 for Mini-DAMA.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0303131N BUDGET ACTIVITY: 3
 PROGRAM ELEMENT TITLE: Minimum Essential Emergency Communications
 Network (MEECN)
 PROJECT NUMBER: X0795 PROJECT TITLE: SUPPORT OF MEECN

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT	FY 1991	FY 1992	FY 1993	TO	TOTAL
NUMBER TITLE	ACTUAL	ESTIMATE	ESTIMATE	COMP	PROGRAM
X0795 MEECN	1,552	2,350	1,350	Cont.	Cont.

B. (U) DESCRIPTION: MEECN is the Tri-Service VLF/LF transmission system which ensures delivery of Emergency Action Messages (EAM) to our strategic platforms. This project identifies, researches, and develops improvements to MEECN. The MEECN Message Processing Mode (MMPM) which reduces transmission time while improving message delivery reliability was developed under this project and is being implemented in the MEECN VLF/LF Systems. A new High Data Rate (HIDAR) mode which significantly reduces message transmission time is under development. Potential improvements in mode design and signal processing are continually being investigated for MEECN application. Independent assessment, T&E support, and MEECN oversight are provided to other development efforts such as the Navy's Non-Linear Adaptive Processor (NONAP) development and Defense Information Systems Agency - sponsored interoperability testing.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:
 - a. (U) Supported NONAP T&E and restarted HIDAR development.
2. (U) FY 1992 PROGRAM:
 - a. (U) Continue HIDAR development; conduct critical design review.
 - b. (U) Perform MMPM Program Acceptance Test for the Message Processing System (MPS) for National Emergency Action Command Post and Dual Frequency MEECN Receiver (DFMR) for Fixed Launch Control Center; certify the implementations.
 - c. (U) Initiate collection of VLF signal phase data vs buoy antenna depth for using antenna depth as a signal phase tracker.
 - d. (U) Performed MMPM Acceptance Test for World-Wide Air Borne Command Post (WWAENCP) Interim MMPM (WIM) and certified implementation.
3. (U) FY 1993 PLANS
 - a. (U) Complete HIDAR development; issue Mode Standard.
 - b. (U) Support HIDAR implementations, testing and certification.
 - c. (U) Complete phase/antenna depth data collection.
4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVOCEANSYSNEN, San Diego, CA.
 CONTRACTORS: GTE, Government Systems Corporation, Needham Heights, MA and Technology Services Corporation, Santa Monica, CA.

E. (U) RELATED ACTIVITIES: PE 0101402N, Navy Strategic Communications (Shore-to-Ship Communications Project X1083) contains VLF/LF systems into which improvements, developed under the MEECN project, will be incorporated.

F. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

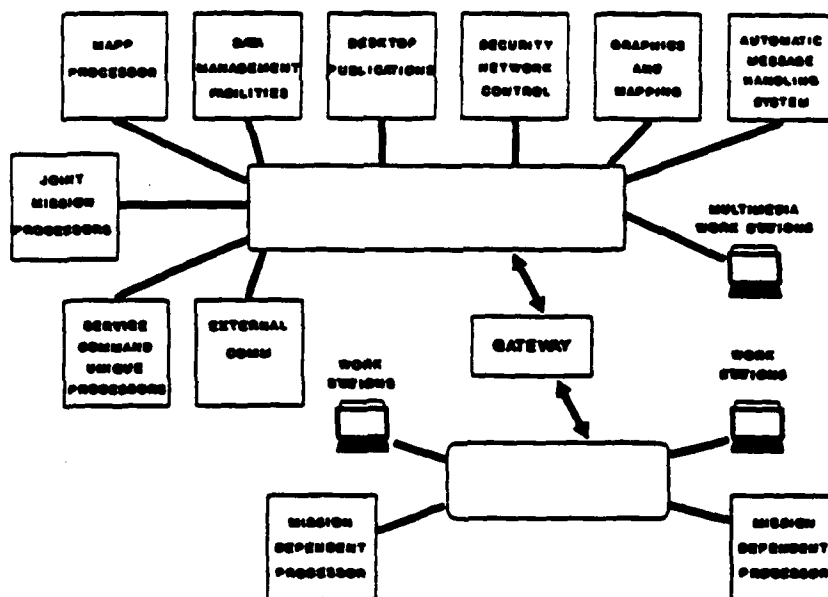
PROGRAM ELEMENT: 0303152N

BUDGET ACTIVITY: 3

PROGRAM ELEMENT TITLE: WWMCCS Information System (WIS)

PROJECT NUMBER: X1798

PROJECT TITLE: WIS Modernization



WWMCCS ADP TARGET ARCHITECTURE

POPULAR NAME: WWMCCS ADP Modernization (WAM)

A. (U) SCHEDULED/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program	WAM DAB			Continuing
Milestone	MS-III 2 OTR			
Engineering	CDR	CDR	Comp NWSUS	Continuing
Milestones	Incs I & II	Inc III	Inc I, II & III	
T&E		NWSUS		Continuing
Milestones		TEMP		
Contract			Deliver	Continuing
Milestones			Inc I, II & III	
BUDGET (\$000)	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
Major Contract	3,891	4,395	3,891	Continuing
Support Contract	0	0	0	Continuing
In-House Support	24	13	15	Continuing
GFE/Other	65	0	0	Continuing
TOTAL	3,980	4,408	3,906	Continuing

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0303152N

BUDGET ACTIVITY: 3

PROGRAM ELEMENT TITLE: WWMCCS Information System (WIS)

PROJECT NUMBER: X1798

PROJECT TITLE: WIS Modernization

B. (U) DESCRIPTION: The Joint WWMCCS ADP Modernization (WAM) program (WIS Modernization) provides phased redesign and replacement of some current WWMCCS hardware and software. The program will develop improved Command and Control (C2) support for the National Command Authority (NCA), the Joint Staff (JS), unified, specified, and component commands, and other C2 organizations throughout the Defense Department. It will provide information processing support during mobilization, monitoring, planning, and execution for peacetime, crisis, and wartime operations.

(U) The Worldwide Military Command and Control System (WWMCCS) is an operational, strategic, multi-service/agency program which provides C2 support to the NCA and the JS by providing Command, Control, and Communications (C3) data processing capabilities, including status of forces and support requirements for use in national security decision making, force preparation and operations planning execution.

(U) The Defense Information Systems Agency (DISA) is the executive agency for the Joint WAM program. DISA has been directed by the JS to develop and implement the Joint Operation Planning and Execution System (JOPES). During this development the JOPES will be tested and installed in thirteen versions. Some WAM hardware must be installed in order to support the software development. In addition, replacement of some software and hardware will ensure standardization and compatibility in the Joint community. JOPES is the driver of the joint WWMCCS/WAM effort.

(U) This program supports the software modernization of the Navy WAM Site Unique Software (NWSUS) to the DoD ADA standard to provide improved maintainability, reusability, and portability. The software is being modernized in three increments with each increment consisting of two phases. Increment I will modernize four systems and Increments II and III will modernize one system each. The first phase will re-design the COBOL systems using the Ada language. The second phase will develop and port the software to the target WWMCCS ADP workstation providing automated interfaces between NWSUS and the JOPES. These automated interfaces will keep NWSUS in synch with the incremental versions of JOPES as they are released twice yearly, allowing NWSUS users to access the JOPES-redefined WWMCCS standard reference files and database without costly software modifications.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:

- a. (U) Completed design of NWSUS Increment I software for USCINCPAC, COMUSKOREA and USCINCLANT.
- b. (U) Began development and testing of NWSUS Increment I software for USCINCPAC, COMUSKOREA, AND USCINCLANT.
- c. (U) Continued design of NWSUS Increment II software for USCINCPAC.
- d. (U) Began technical review of JOPES versions III and III-1 software design specifications.
- e. (U) Began design of NWSUS Increment III software for USCINCLANT.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0303152N

BUDGET ACTIVITY: 3

PROGRAM ELEMENT TITLE: WNMCCS Information System (WIS)

PROJECT NUMBER: X1798

PROJECT TITLE: WIS Modernization

2. (U) FY 1992 PROGRAM:
 - a. (U) Continue design of NWSUS Increment III.
 - b. (U) Continue development and test of NWSUS Increment I.
 - c. (U) Continue technical review of JOPES version III-1 software design.
 - d. (U) Begin development and testing of NWSUS Increments II and III.
 - e. (U) Begin installation of NWSUS Increment I.
 - f. (U) Begin technical review of JOPES versions III-2 and IV software design specifications.
 - g. (U) Complete design of NWSUS Increment II.
 - h. (U) Complete NWSUS Increment II test plan.
 3. (U) FY 1993 PLANS:
 - a. (U) Complete NWSUS Increment III test plan.
 - b. (U) Continue development and testing of NWSUS Increment III.
 - c. (U) Begin installation of NWSUS Increments II and III.
 - d. (U) Complete design of NWSUS Increment III.
 - e. (U) Complete installation of NWSUS Increments I, II and III at USCINCPAC, USCINCLANT, and COMUSKOREA.
 - f. (U) Complete development and testing of NWSUS Increments I, II and III.
 - g. (U) Continue technical review of JOPES version IV software design specifications.
 - h. (U) Begin technical review of JOPES versions V and VI software design specifications.
 4. (U) Program to Completion: This is a continuing program.
 - a. (U) Continue interface development between NWSUS and JOPES.
 - b. (U) Continue technical review of JOPES versions software design specifications.
- D. (U) WORK PERFORMED BY: IN HOUSE: COMOPTEVFOR Norfolk, VA.
CONTRACTORS: Andruis Research Corporation, Bethesda, MD; Booz-Allen Hamilton, Bethesda, MD; PRC, McLean, VA.
- E. (U) COMPARISON WITH FY 1992/1993 PRESIDENT'S BUDGET:
1. (U) Technology Changes: Not Applicable.
 2. (U) Schedule Changes: The restructure of the NWSUS contract from fixed price incentive to a task order contract restores the original program schedule for the completion of the development efforts and installation of increments II and III.
 3. (U) Cost Changes: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0303152N **BUDGET ACTIVITY:** 3
PROGRAM ELEMENT TITLE: WNMCCS Information System (WIS)
PROJECT NUMBER: X1798 **PROJECT TITLE:** WIS Modernization

F. (U) PROGRAM DOCUMENTATION:

1. Joint Mission Element Need Statement (JMENS)	06/82
2. JOPES Required Operational Capability (ROC)	02/83
3. Joint WAM Integrated Logistics Support Plan (ILSP)	09/90
4. Joint WAM Test and Evaluation Master Plan (TEMP)	04/90
5. Joint WAM Decision Coordination Paper (DCP)	02/91

G. (U) RELATED ACTIVITIES:

1. (U) JOPES is the driver of the joint WNMCCS/WAM effort. If unable to meet the Joint service schedule or Navy supported sites will be unable to fully participate in strategic and Joint warfighting requirements.

2. PE 0303152F WNMCCS ADP Modernization (WAM), funds the Joint Program Management Office (JPMO).

3. PE 0303154K (WAM), PE 0303151H (WNMCCS ADP), and PE 0902498H (Management Headquarters (ADMIN)) fund Joint WAM procurement for Defense Information Systems Agency, Defense Nuclear Agency, and the US Marine Corps respectively.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
PROCUREMENT					
OPN 125	69	11,575	6,278	Cont.	Cont.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) TEST AND EVALUATION DATA: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0303401N

BUDGET ACTIVITY: 5

PROGRAM ELEMENT TITLE: Communications Security

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X0734	Communications Security R&D					
X1237	TEMPEST OP					
	TOTAL					

B. (U) DESCRIPTION: The goal of the Navy Communications Security (COMSEC) program is to ensure the continued protection of Navy and Joint communications systems from hostile exploitation. The program accomplishes this by: analyzing and evaluating currently deployed and developmental Command, Control, Communications (C3) and Information systems, Electronic Warfare (EW) and Intelligence systems to identify vulnerabilities; developing and testing new cryptographic equipments, systems and techniques; and developing equipment and techniques for testing operational and developmental equipment in order to protect against compromising emissions. The current emphasis is on achieving an interoperable, more secure electronic key distribution capability, developing secure modules to satisfy emerging security requirements, and developing security policy for communications system architectures.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0303401N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Communications Security
PROJECT NUMBER: X0734 PROJECT TITLE: Communications Security R&D

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X0734					

B. (U) DESCRIPTION: The Communications Security (COMSEC) Project analyzes existing COMSEC equipments and develops improved, interoperable communications security equipment and methods to protect classified communications from adversary exploitation. The project is a continuing effort to modernize obsolete cryptographic equipment and ancillaries with state-of-the-art replacements in order to meet the evolving threat. Replacement COMSEC, in most cases, will be implemented using embedded modules that plug into host equipment. The Navy COMSEC program will support the development of the host equipment, and will develop the embedded crypto modules (using

Under the CLASSIC Lightning program, the Navy COMSEC program will revolutionize the Navy's COMSEC Material System. The overall objectives of CLASSIC Lightning are to:

and (2) eliminate most of the manual custodian workload. The CLASSIC Lightning program includes, the development of the Navy Key Distribution System (NKDS) and supporting efforts for benign key fill. Other projects under COMSEC R&D development include: Security Support to communications systems such as Joint Tactical Information Distribution System/Multifunctional Information Distribution System (JTIDS/MIDS), Mini DANA, Tactical Air Combat Training System (TACTS), development of Security architectures for COPENICUS and its related systems, development of a family of security devices to satisfy developed security architecture called the Modular Security Devices (MSD).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- (U) Developed requirements for CLASSIC Lightning Modifications to the NKDS Contract.
- (U) Completed fleet tests and demonstration of electronic key material distribution in support of CLASSIC Lightning.
- (U) Developed security architecture for COPENICUS TADIXS.
- (U) Began development of the External COMSEC Adapter (ECA) to satisfy COPENICUS TADIXS's near term security requirements.
- (U) Provided security evaluation support to Navy communications programs: JTIDS/MIDS, Mini-DANA, TACTS, Common High Bandwidth Data Link - Shipboard Terminal (CHBDL-ST), Extremely High Frequency - Information Exchange System (EHF-IXS).

2. (U) FY 1992 PROGRAM:

- (U) Award CLASSIC Lightning modification to the NKDS contract.
- (U) Define requirements for automated net planning and
in support of the Multi-Command Required Operational Capabilities (MROC) 3-89 for Classic Lightning.
- (U) Develop security policy/requirements for COPENICUS.
- (U) Conduct Critical Design Review (CDR) for ECA and perform integration and test for the COPENICUS TADIXS test bed.
- (U) Provide security evaluation support to Navy Multiple Sources programs: JTIDS/MIDS, Mini-DANA, TACTS, CHBDL-ST, EHF-IXS.

3. (U) FY 1993 PLANS:

- (U) Conduct Preliminary Design Review and Critical Design Review for NKDS.
- (U) Perform requirements definition for
in support of CLASSIC Lightning.
- (U) Begin Full Scale Engineering Development (FSED) for CTIC DS-101 Hybrid (CDH) based MSD1.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0303401N BUDGET ACTIVITY: 5
 PROGRAM ELEMENT TITLE: Communications Security
 PROJECT NUMBER: X0734 PROJECT TITLE: Communications Security R&D

- d. (U) Perform system certification and accreditation of COPENICUS TADIXS.
- e. (U) Perform requirements analysis for MSD 2, which will be based on a chip of newer design with increased capability.
- f. (U) Provide security evaluation support to Navy communications programs: MIDS, Mini-DAMA, CHEDL-ST, TACTS.
- 4. (U) Program to Completion:
 - a. (U) This is a continuing program.

D. (U) WORK PERFORMED BY: In-House: Naval Research Laboratory, Washington DC; Naval Electronics Systems Security Engineering Center, Washington DC; Naval Ocean Systems Center, San Diego, CA; and Naval Electronic Systems Engineering Center, Portsmouth, VA. Contractors: SAIC San Diego, CA; Booz Allen & Hamilton, Bethesda, MD.

- E. (U) COMPARISON WITH FY 1991 PRESIDENT'S BUDGET:
 - 1. (U) Technology Changes: None.
 - 2. (U) Schedule Changes: None.
 - 3. (U) Cost Changes: Decrease of \$4,337 results in reduced support to TACTS, Mini-DAMA and CHEDL-ST an delays in the Next Generation Secure Voice (NGS) and KG-45 replacement programs.

F. (U) PROGRAM DOCUMENTATION:
 OR#14409486 Operational Requirement for NKDS 3/87
 Program Change Approval Document (PCAD) for the NKDS 7/89
 TEMP #0511-01 for NKDS 2/90
 PCAD for the NKDS (Change 2) 8/91
 Information Security Resources Plan 4/90

G. (U) RELATED ACTIVITIES: Program Element 0303401G

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT					
OPN #129	81,199	61,309	76,956	CONT	CONT
OPN #130	44,733	49,118	33,876	CONT	CONT
OPN #140/141	5,817	2,841	3,071	CONT	CONT
OPN #139	764	4,691	9,778	CONT	CONT

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None

J. (U) MILESTONE SCHEDULE:

MAJOR MILESTONES	M/S II	M/S III	IOC
NKDS	4Q/89	4Q/94	
MSD1	3Q/93	1Q/95	
	DT	OT	
NKDS	2Q/94	4Q/94	
MSD1	3Q/94	4Q/94	

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0303603N

BUDGET ACTIVITY: 5

PROGRAM ELEMENT TITLE: Milstar Satellite Communication System

PROJECT NUMBER: X1880

PROJECT TITLE: Joint Terminal Project
Office (JTPO)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT

NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X1880	Milstar JTPO	0	3,424	2,371	Cont.	Cont.

B. (U) DESCRIPTION: The Milstar program is comprised of satellites, control stations, and air, ship and ground terminals to provide worldwide, secure, anti-jam, survivable communications for the National Command Authority, Specified/Unified CINCs, and operational commanders. The Milstar JTPO coordinates and directs the development of user terminals by (1) ensuring terminal interoperability, (2) joint integrated logistics support (ILS) planning, (3) conducting joint interoperability tests, (4) writing terminal specifications and standards, (5) monitoring service terminal designs and (6) providing technical support to OSD, OJCS, CINCs and users.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Not Applicable.

2. (U) FY 1992 PROGRAM: Coordinate and direct the development of user terminals in support of directed tasks by developing interoperable medium data rate (MDR) protocols; updating and reissuing the joint ILS plan to accommodate a reduced number of low data rate (LDR) terminals and new terminal initiatives for MDR terminals; conducting interoperability testing in support of an Army production decision; developing an LDR/MDR terminal specification for satellites Milstar II; evaluating engineering changes to ensure tri-service interoperability; and providing technical assistance in the areas of user requirements as well as enhancing a Milstar Information Exchange System.

3. (U) FY 1993 PLANS: Continue ongoing efforts in the six directed tasks and provide technical direction to evolving MDR terminals.

4. (U) PROGRAM TO COMPLETION: This is a continuing program. It will fund efforts in the six directed tasks until transition of JTPO responsibilities to the system operator (AFSPACECOM).

D. (U) WORK PERFORMED BY: IN-HOUSE: NOSC, San Diego, CA; NADC, Warminster, PA; AF Wright Laboratory, Dayton, OH; SSD/NSSA, Los Angeles, CA. CONTRACTORS: Booz, Allen & Hamilton, Bethesda, MD; Galaxy Scientific Corporation, Alexandria, VA.

E. (U) RELATED ACTIVITIES: PE 0303603N provides for overall direction of tri-service terminal developments, one of which is PE 0604577N Navy SatCom Terminals, to ensure interoperability.

F. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0305111N

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE: Weather Service

PROJECT NUMBER: X0523 PROJECT TITLE: Satellite Data Processing System (SATDAT)

A. (U) RESOURCES: (Dollars in thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X0523	SATDAT	1,015	1,118	777	Cont.	Cont.

B. (U) DESCRIPTION: This project develops systems and associated software to process and manage satellite remotely-sensed environmental data at Oceanography Centers ashore and on ships equipped with the AN/SMQ-11 satellite receiver/recorder afloat. Much of the software developed under this project is designed to allow effective use of the satellite data in computer-based global, regional and tactical oceanographic and atmospheric analysis and prediction models. The project also supports code conversion, rehosting of software from other sources and modifications to the Tactical Environmental Support System - TESS(3) - Data Base Management System (DBMS) and Man-Machine Interface (MMI).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Continued development of multi-sensor, multi-satellite applications software for TESS(3) and large scale computer.
- b. (U) Began developing capability for integrating atmospheric sounder and SSM/I data.
- c. (U) Began modifications to TESS(3) DBMS and MMI.

2. (U) FY 1992 PROGRAM:

- a. (U) Complete conversion and rehosting of the National Hurricane Center NHC-83 tropical cyclone forecast model.
- b. (U) Begin code conversion for large scale computer.
- c. (U) Continue modifications to TESS(3) DBMS and MMI.
- d. (U) Continue development of multi-sensor, multi-satellite applications software for TESS(3) and large scale computer.

3. (U) FY 1993 PLANS:

- a. (U) Complete developing capability for integrating atmospheric sounder and SSM/I data.
- b. (U) Complete modifications to TESS(3) DBMS and MMI.
- c. (U) Begin development of next generation DBMS.
- d. (U) Continue development of multi-sensor, multi-satellite applications software for TESS(3) and large scale computer.
- e. (U) Complete code conversion for large scale computer.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Stennis Space Center, MS.
CONTRACTORS: None.

F. (U) RELATED ACTIVITIES: PE 0603704N, ASW Oceanography - provides satellite data; PE 0604230N, Warfare Support Systems - TESS(3) DBMS/MMI.

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0305160N

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE: Defense Meteorological Satellite Program (DMSP)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X0524	DMSP NAVY SUPPORT					
		1,288	1,293	1,288	Cont.	Cont.
X1452	GEOSAT	2,869	11,755	16,310	3,887	41,966
	TOTAL	4,157	13,048	17,598	Cont.	Cont.

B. (U) DESCRIPTION: This program element includes two projects - the DMSP Navy Support project and the Geodetic/Geophysical Satellite (GEOSAT) project: (1) Defense Meteorological Satellite Program (DMSP) is a Joint Service use program which supports sensor and satellite engineering and technology. The DMSP Navy Support project provides for Navy participation in DMSP. (2) GEOSAT provided ocean topography information from a single satellite from 1985 until it failed in January 1990. In FY 1991, the Navy began to develop a follow-on capability to provide this required ocean topography information via the GEOSAT follow-on program (GFO).

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0305160N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Defense Meteorological Satellite Program (DMSP)
PROJECT NUMBER: X0524 PROJECT TITLE: DMSP - Navy Support

C. (U) DESCRIPTION: This project provides Navy participation in the joint service use Defense Meteorological Satellite Program (DMSP). It funds Navy efforts associated with the special sensors located on the DMSP satellites. The current version of the DMSP satellite (Block 5D) is scheduled for a major upgrade (Block 6) circa 2005. Risk reduction studies for Block 6 are currently underway. During risk reduction the Navy will investigate various "options" sensors to be added to the baseline Block 6 design in support of Navy warfare areas. In addition, this project provides for Navy participation as a voting member of the DMSP Configuration Control Board. This participation includes the review of Engineering Change Proposals, specification changes, waivers or any other technical matters which might have a significant impact on the Navy user segment.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:
 - a. (U) Continued study of Navy "options" sensors such as Special Sensor Microwave/Imagers, Scatterometers and Altimeters.
 - b. (U) Continued development of satellite data processing methods.
 - c. (U) Continued participation on the DMSP Configuration Control Board.
2. (U) FY 1992 PROGRAM:
 - a. (U) Continue study of space-based sensors.
 - b. (U) Continue investigation of satellite data processing methods.
 - c. (U) Continue participation on the DMSP Configuration Control Board.
3. (U) FY 1993 PLANS:
 - a. (U) Begin airborne oceanographic measurements and simulations of proposed Navy "options" sensors.
 - b. (U) Closely monitor Air Force Block 6 efforts.
 - c. (U) Continue participation on the DMSP Configuration Control Board.
4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Wash., DC; NSSA, Los Angeles, CA; CONTRACTOR: Hughes, Los Angeles, CA; Harris, Melbourne, FL; Aerojet, Azusa, CA; Lockheed, Sunnyvale, CA; GE, Princeton, NJ; Westinghouse, Baltimore, MD; Aerospace Corp, Los Angeles, CA.

F. (U) RELATED ACTIVITIES: PE 0305160F, Air Force DMSP - provides AF engineering for DMSP; PE 0604218N, Air/Ocean Equipment Engineering - AN/SMQ-11 satellite receiver/recorder system engineering.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
WPN P-1 TED	0	0	0	381,500	381,500

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0305160N

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE: Defense Meteorological Satellite Program (DMSP)

PROJECT NUMBER: X1452 PROJECT TITLE: Geodetic/Geophysical Satellite (GEOSAT)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X1452	GEOSAT	2,869	11,755	16,310	3,887	41,966

B. (U) DESCRIPTION: This project provides a satellite-borne altimeter to obtain ocean topography measurements from which tactically significant features such as fronts, eddies, and ice edge are derived. Topography provides a unique and important data source in support of a number of Naval warfare areas such as anti-submarine and undersea warfare. The data was previously provided by GEOSAT from 1985 until its failure in January 1990. The GEOSAT Follow-On (GFO) satellite currently under development is intended to provide interim altimetry data until DMSP Block 6 becomes operational in FY 2005. The sensors developed for GFO satellite will provide a baseline for the new operational radar altimeter sensors to be incorporated in the DMSP development efforts. Prototype, and both follow-on satellites, will be acquired via competitive procurement. Contractor proposals due February 1992.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Completed in-house preliminary design of the GFO.
- b. (U) Began in-house radar altimeter sensor design.

2. (U) FY 1992 PROGRAM:

- a. (U) Initiate GFO satellite development via competitive procurement.
- b. (U) Continue radar altimeter sensor design.

3. (U) FY 1993 PLANS:

- a. (U) Continue satellite development.
- b. (U) Continue radar altimeter sensor design.
- c. (U) Complete Preliminary Design Review of GFO.

4. (U) PROGRAM TO COMPLETION: Complete satellite development (FY 1995); Launch protoflight satellite (FY 1995).

D. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Wash., DC. CONTRACTOR: Applied Physics Lab (sensor technology), Laurel, MD. Prototype plus follow-on contractors will be selected via competitive process.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. TECHNOLOGY CHANGES: Not Applicable.
2. SCHEDULE CHANGES: None.
3. COST CHANGES: None.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0305160N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Defense Meteorological Satellite Program (DMSP)
PROJECT NUMBER: X1452 PROJECT TITLE: Geodetic/Geophysical Satellite (GEOSAT)

F. PROGRAM DOCUMENTATION: Non-Acquisition Program Definition Document #217-094 dated 5 JUN 90 Operational Requirement #217-094-92 dated 18 OCT 90

G. (U) RELATED ACTIVITIES: PE 0604218N, Air/Ocean Equipment Engineering - AN/SMQ-11 satellite receiver/recorder system engineering.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
WPN P-1 TED	0	0	0	85,036	85,036

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE:

Begin GPO Preliminary Design Efforts	01/91
Begin Follow-on Satellite Development	06/92
Launch Protoflight Satellite	09/95
Production Decision	12/95

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0601152N

BUDGET ACTIVITY: 1

PROGRAM ELEMENT TITLE: In-House Independent Laboratory Research

PROJECT NUMBER: N/A

A. (U) RESOURCES: (Dollars in Thousands)

TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROG.
In-House Independent Laboratory Research	24,135	14,000	16,180	CONT.	CONT.

B. (U) DESCRIPTION: This element provides the primary means for Navy Warfare Centers to strengthen in-house capabilities and to initiate high-risk, high-payoff research relevant to their respective missions and to the needs of the Navy. A prime objective is to enhance the creativity and productivity of in-house Warfare Centers, and to attract and retain talented and creative scientists and engineers. Research is identified in those fields of science most closely related to the Navy's mission (reflected in the Office of Naval Research (ONR) Research Investment Strategy) and on new concepts relevant to future Navy requirements (ONR thrust areas of Ocean Sciences, Advanced Materials, and Information Sciences, plus the overall Sustaining Program); consideration is also given to relevance to the DOD Critical Technologies (CT). Efforts are peer-reviewed, biennially.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS: Examples are listed by ONR Research Investment Strategy emphasis; DOD CT, where applicable, are noted in parentheses.

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Ocean Sciences--Showed that time fluctuations in the scattered acoustic field may be used to classify under-ice targets, a significant improvement over current capability. (CT: Signal Processing).

b. (U) Advanced Materials--Established a more coherent understanding into the basic mechanism which causes high temperature property degradation. These materials are needed for high thrust low weight aircraft engines required for air superiority into the 21st century. (CT: Composite Materials).

c. (U) Information Sciences--Developed a unique pattern-recognition technique capable of modeling the recognition of moving objects. Applications include real-time learning situations where unknown targets may enter the field, such as automatic target recognition, surveillance and automatic control (CT: Machine Intelligence & Robotics).

d. (U) Sustaining Program--Established a reliable animal model that demonstrates a cold-induced memory decay strikingly similar to the human response, showed that the cold-induced decrease in short term memory correlates both with subtle temperature changes in the brain's hippocampus and with alterations of specific neurohormones in that region of the brain, and have determined that the amino acid tyrosine significantly reduces the magnitude of memory loss by cold stress.

2. (U) FY 1992 PROGRAM:

a. (U) Ocean Sciences--sound propagation modeling (CT: Weapon System Environment).

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0601152N BUDGET ACTIVITY: 1
PROGRAM ELEMENT TITLE: In-House Independent Laboratory Research
PROJECT NUMBER: N/A

b. (U) Advanced Materials--electrochemistry of batteries; diamond semiconductor film material deposition; amplification of trace atmospheric elements in detection; science of superlattices of narrow band-gap semiconductors; interactions of acoustic, electromagnetic, and elastic waves with materials (CT: Semiconductor Materials & Microelectronic Circuits).

c. (U) Information Sciences--robust methods for tactical missile computations (CT: Data Fusion and Simulation & Modeling).

d. (U) Sustaining Program--high power millimeter wave tube technology (for communications, radar, tracking); radiation, space charge, and field effects in charged particle beams; energy storage research for pulsed power (CT: Signature Control and Pulsed Power).

3. (U) FY 1993 PLANS:

a. (U) Ocean Sciences--investigation of fluid flow phenomena which are related to various tactical and strategic weapons operations/warhead design, and the development of mathematical methodologies for these investigations (CT: Computational Fluid Dynamics).

b. (U) Advanced Materials--fundamental studies on materials with potential for major improvements in effectiveness of Navy weapons systems, ordnance, strategic/space systems. Investigation of those phenomena and materials, that are likely to lead to lighter-weight permanent magnets (CT: High Energy Density Materials).

c. (U) Information Sciences--investigation of the areas of artificial intelligence, advanced filtering techniques, information handling, and computer systems architectures that may lead to smart weapons, highly adaptive systems, and improved Naval strategy (CT: Machine Intelligence & Robotics, Signal Processing and High Performance Computing).

d. (U) Sustaining Program--investigation of those phenomena involving propagation of charged particles for beam weapons and millimeter radiation (CT: Pulsed Power).

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Naval Air Warfare Center (Patuxent River, MD; China Lake, CA); Naval Surface Warfare Center (Dahlgren, VA; Carderock, MD); Naval Undersea Warfare Center (Newport, RI); Naval Command, Control and Ocean Surveillance Center (San Diego, CA); and several other Navy R&D Centers and facilities engaged in specialized areas of research.
CONTRACTORS: None.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: Not applicable.

3. (U) COST CHANGES: FY-93 DOD reduction of \$10M to extend the FY 1992 Congressional reduction into the outyears, plus a \$1M transfer of NAVMED projects to consolidate medical projects within DOD.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0601152N

BUDGET ACTIVITY: 1

PROGRAM ELEMENT TITLE: In-House Independent Laboratory Research

PROJECT NUMBER: N/A

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: Program Element 0601153N, Defense Research Sciences; Program Element 0602111N, Anti-Air Warfare/Anti-Surface Warfare Technology; Program Element 0602234N, Systems Support Technology; Program Element 0602314N, ASW Technology; Program Element 0602936N, Independent Exploratory Development. This program adheres to Tri-Service Reliance Agreements on Basic Research and oversight is provided by 6.1 Tri-Service Office of Service Research (OXR) Cooperation. Work in this Program Element is related to and fully coordinated with efforts in PE0601101A and PE0601101F in accordance with the ongoing Reliance joint planning process and contains no unwarranted duplication among the Military Departments.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0601153N

BUDGET ACTIVITY: 1

PROGRAM ELEMENT TITLE: Defense Research Sciences

PROJECT NUMBER: N/A

A. (U) RESOURCES: (Dollars in Thousands)

TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Defense Research Sciences	366,098	381,180	457,389	CONT.	CONT.

B. (U) DESCRIPTION: Growth in program funds reflects the DOD position promoting a robust Science and Technology (S&T) program and an improved basic research foundation for enabling technologies supporting the broad range of defense requirements. Within a changing global environment, DOD has formulated a new S&T strategy; this strategy provides options for future defense requirements, posed by multiple threats in a variety of regional conflict scenarios. The purpose of this element is to sustain U.S. naval scientific and technological superiority, to provide new concepts and technological options for the maintenance of naval power and national security, and to afford the means to avoid scientific surprise. The Program is guided by the Office of Naval Research (ONR) Research Investment Strategy, such that research efforts support naval warfare requirements and the DOD Critical Technologies. The Investment Strategy emphasizes Ocean Sciences, Advanced Materials, and Information Sciences; increased funds would thus be applied to strengthen science areas supportive of needs such as Mine Countermeasures (MCM) and coastal acoustics. A current example of the Ocean Sciences emphasis is a Special Research Program (SRP) associated with MCM, Coastal Benthic Boundary Layer; this SRP focuses on understanding the physics of detecting and identifying bottom and buried objects in shallow waters from the surf zone to the continental shelf, thus also strongly supporting the Weapon System Environment and Simulation & Modeling DOD Critical Technologies. The Sustaining portion of the ONR investment is directed toward maintenance of scientific superiority and provision of scientific options which may prevent, as well as create, scientific and technological surprise. Sustaining efforts support a diversity of other initiatives from cost reduction to operation and improvement of research ships and submersibles.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS: Examples are listed by ONR Research Investment Strategy emphasis; DOD Critical Technologies (CT), where applicable, are noted in parentheses.

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Ocean Sciences: Developed a world-wide atmospheric noise prediction model for ELF/VLF/LF; demonstrated that bubble clouds have cloud resonances--important to low frequency operations; and prepared quantitative visualization of 3-D wake topology (CT: Weapon System Environment, Passive Sensors and Simulation & Modeling).

b. (U) Advanced Materials: First-time detection & arrest/delay of crack propagation in composites, high temperature superconducting materials (YBCO) synthesized for microwave antennas (CT: Composite Materials and Superconductivity).

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0601153N

BUDGET ACTIVITY: 1

PROGRAM ELEMENT TITLE: Defense Research Sciences

PROJECT NUMBER: N/A

c. (U) Information Sciences: Examples of precision engineering at nanometer surface roughness level, virtual environment, and software testing in parallel environment based on theory rather than extended test (CT: Software Engineering, High Performance Computing, Machine Intelligence & Robotics and Flexible Manufacturing).

d. (U) Sustaining Program: Deep ultraviolet patterned monolayers useful as prosthetic implants; and, improved simulation of flames related to greater fuel efficiency.

2. (U) FY 1992 PROGRAM (new initiatives):

a. (U) Ocean Sciences: Nonlinear dynamics of ocean waves; and marine aerosol distribution, extinction and conversion (CT: Weapons System Environment and Simulation & Modeling).

b. (U) Advanced Materials: Studies of advanced infrared materials; molecular design and fabrication of films on surfaces; electronic interactions in highly correlated systems; superconducting materials; chemistry of new composite materials; polycyclic materials for propellants and explosives; biopolymeric materials; and molecular engineering of biomaterials (CT: Passive Sensors, Superconductivity, Composite Materials and Biotechnology).

c. (U) Information Sciences: Investigations into design and construction of verifiable correct complex software systems and parallel scientific computer architectures; hydrodynamically induced propulsor signatures; and neural networks (CT: Software Engineering, High Performance Computing, Signature Control and Machine Intelligence & Robotics).

d. (U) Sustaining Programs: Studies of sensory-driven motor control in biological systems; real neuron computation (CT: Machine Intelligence & Robotics); coastal benthic boundary layer; nonlinear dynamics/chaos/diffractals; design of enzymes through new biocatalysts (CT: Biotechnology); reliability/failure analyses; wound repair; neurobiological mechanisms of cold-induced amnesia; flares at solar maximum; and transient stimulated scattering effects.

3. (U) FY 1993 PLANS (new initiatives):

a. (U) Ocean Sciences: Global change in middle atmosphere; marine boundary layer spectra similarity; oceanic turbulence via fine scale structure; molecular interactions at marine interfaces; tropical cyclones; ocean acoustic surface reverberation; and ship wake late evolution & environmental interaction (CT: Weapons System Environment and Simulation & Modeling).

b. (U) Advanced Materials: Adhesion sciences/nanomechanics; coatings & interfaces in space; enhanced vibronic/energy transfer in rare earth solid state laser materials; kinetic control of synthetic composite processes; modeling of composite structures; polymer surface structures; heterogeneous energetic decomposition; submarine parallel computing; metamorphic materials & structures; adaptive, quiet, "smart" structures; and combustion of high energy fuels (CT: Air-Breathing Propulsion, Hypervelocity Projectiles & Propulsion, Signature Control, High Energy Density Materials, and Composite Materials).

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0601153N

BUDGET ACTIVITY: 1

PROGRAM ELEMENT TITLE: Defense Research Sciences

PROJECT NUMBER: N/A

c. (U) Information Sciences: Man-machine dialogue for decision support; sea-ice electromagnetics; visual representation; massive parallelism; point & line processing in the plane; signal/image processing; and low light level optical image amplification & detection (CT: Machine Intelligence & Robotics, Flexible Manufacturing, Signal & Image Processing, High Performance Computing and Simulation & Modeling).

d. (U) Sustaining Programs: Psychophysical & neurophysical spatial orientation; missile aim-point selection; and neural network-based mechanical diagnostics (CT: Simulation & Modeling).

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Navy laboratories (27%). CONTRACTORS: universities (about 58% of funding), industry and not-for-profit institutions (15%).

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: Not applicable.

3. (U) COST CHANGES: An increase of \$41M in FY93 compared to the prior estimate is based on a \$35M DOD increase to improve the foundation of basic research leading to defense enabling technologies, plus a one-time DBOF adjustment for laboratory cost recovery, less a transfer of NAVMED projects to consolidate medical projects within DOD.

F. (U) PROGRAM DOCUMENTATION: None.

G. (U) RELATED ACTIVITIES: PE 0602111N, Anti-Air Warfare/Anti-Surface Warfare Technology; PE 0602121N, Surface Ship Technology; PE 0602122N, Aircraft Technology; PE 0602234N, System Support Technology; PE 0602314N, ASW Technology; PE 0603207N, Air/Ocean Tactical Applications; PE 0603785N, ASW Environmental Acoustic Support; PE 0601152N, In-House Independent Laboratory Research; PE 0601102A, Army Defense Research Sciences; PE 0601102F, Air Force Defense Research Sciences. This program adheres to Tri-Service Reliance Agreements on Basic Research and oversight is provided by Tri-Service 6.1 Cooperation.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602111N

PROGRAM ELEMENT TITLE: ANTI-AIR/ANTI-SURFACE WARFARE TECHNOLOGY

PROJECT NUMBER: N/A

BUDGET ACTIVITY: 1

TECHNOLOGY

PROJECT TITLE: N/A

A. (U) RESOURCES: (Dollars in Thousands)

	FY1991	FY1992	FY1993	TO	TOTAL
TITLE	ACTUAL	ESTIMATE	ESTIMATE	COMPLETE	PROGRAM
Anti-Air/Anti-Surface Warfare Technology	69,989	67,933	86,931	CONT.	CONT.

B. (U) DESCRIPTION: This program supports future surveillance and weapons systems for surface, air, and space platforms for Navy missions in Anti-Air (AAW) and Anti-Surface Warfare (ASUW). This element supports DOD Science & Technology (S&T) Strategy in Precision Strike and Technology for Affordability. It also supports the DOD Critical Technologies Plan in the following areas: Microelectronics, Parallel Computer Architectures, Simulation and Modeling, Photonics, Sensitive Radars, Passive Sensors, Signal Processing, Signature Control, Data Fusion, Computational Fluid Dynamics, Air-Breathing Propulsion, High-Energy Density Materials and Composite Materials. Anti-Air Warfare requires surveillance and intercept capabilities to counter the threat in a multi-polar world with a globally dispersed Navy. It is also essential to develop innovative short-range defense technology to support ships in a reduced force structure. Anti-Surface and Strike Warfare requires enhanced launch stand-off, precision targeting, survivability, post-strike damage assessment and affordable munitions.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Point Defense: Developed concept for multi-sensor point defense system; demonstrated in anechoic chamber experiments. the ability to resolve techniques; tested new cueing waveforms which detected simulated

aerostat extended radar assembled; completed 3-D processing for dim-target Infrared (IR); completed multiple-target tracking experiments; completed window, line selection, and adaptive optics for high-power chemical laser.

b. (U) Wide Area Surveillance: Completed design of wideband Airborne Early Warning (AEW) radar test bed; completed lab testing of Infrared Search and Track (IRST); initiated lab test of low-cost High-Frequency Direction Finding (HFDF) system, and completed High Frequency (HF) geo-location algorithms; developed techniques for Inverse Synthetic Aperture (ISAR) imaging of ships from space; initiated space-based Electro Optical (EO) interferometry sensor.

c. (U) Area Surveillance: Completed design of shared-aperture airborne IR/EO sensor; established joint-program with USAF in air-target ID; conducted IR background data gathering, analysis and modelling; conducted field measurements with ultra-wideband radar; assessed vulnerability of fleet airborne radars to Anti-Radiation Missiles (ARM).

d. (U) Air Superiority: Developed concept for Lock-On-After-Launch (LOAL) guidance and control G&C; completed initial phases of diamond IR domes for high-speed and high-temperature missile flight; developed concept for active array cued/supercued Electronic Countermeasures (ECM)-resistant fire-control radar.

e. (U) Area/Wide Area Defense Weapons: Developed fragmentation size control for deformable, directional warhead/fuse; fabricated a kill assessment Cepstral processor; developed an ECM-resistant, frequency-agile, semi-active guidance concept.

f. (U) ASUW/Strike Weaponry: conducted breadboard testing of a 0.1deg/hr fiber optic gyro; began G&C and propulsion investigations for next-generation sea-skimming anti-ship missiles; demonstrated real-time image correlation of aircraft sensor video with prebriefed images for one-pass

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602111N

PROGRAM ELEMENT TITLE: ANTI-AIR/ANTI-SURFACE WARFARE TECHNOLOGY

PROJECT NUMBER: N/A

BUDGET ACTIVITY: 1

TECHNOLOGY

PROJECT TITLE: N/A

targeting applications; initiated investigations into massively parallel computing and optical image processing technologies for applications to real-time precision strike mission planning and autonomous missile G&C.

g. (U) SEALAR: Conducted preparations for Sea Launch and Recovery Test Program.

2. (U) FY 1992 PROGRAM:

a. (U) Point Defense: Conduct over-water tests of superresolution antenna concept to determine resistance to multi-path performance degradation; complete algorithm development for multi-sensor detection of low Radar Cross Section (RCS) sea-skimming targets; begin feasibility investigations of EO multi-target tracking concept for command-all-the-way or command-most-of-the-way weapons guidance; begin technology development for low-cost ship-self-defense weapons system with improved keep out and lethality over current systems; demo 3-D algorithms for dim IR targets; continue development of Ultra-wideband radar; procure shipIRST Optical Director and integrate focal plane arrays for field testing; assess electronic vulnerability to high-rep-rate millimeter High Powered Microwave (HPM).

b. (U) Wide Area Surveillance: Complete surface ship wake detection and classification; continue space EO interferometry; fabricate wideband AEW radar; continue space-based ISAR; complete and field test ship HPDF hardware.

c. (U) Area Surveillance: Complete and field test advanced ship air-surveillance radar; continue shared-aperture IR/EO sensor development; continue air target ID, IR background characterization and counter-ARM efforts; initiate multi-function radar development; continue 2D air-target ID; continue automatic ship classification.

d. (U) Air Superiority: Continue LOAL G&C investigations; initiate feasibility investigations into close encounter (zero CEP) ordnance concepts; investigate multi-band/multi-mode IR sensors with agile field-of-view capabilities and ISAR active-array radar concepts to provide superior situational awareness capabilities for future air combat weapons systems; complete active-array cued/supercued investigation; fabricate and test 8-inch diameter integrated guidance-fuze active-array antenna.

e. (U) Area/Wide Area Defense Weapons: Complete directional ordnance system investigation; complete real-time kill assessment Cepstral processor; complete ECM-resistant, frequency-agile semi-active guidance concept.

f. (U) ASUW/Strike Weaponry: Fabricate and test brassboard fiber-optic gyro on a chip; continue multi-sensor correlation for land attack targeting algorithm development; continue precision strike mission planning and autonomous missile G&C technology investigations; continue next-generation anti-ship missile propulsion and G&C investigations.

g. (U) SEALAR: Continue efforts to complete Sea Launch and Recovery Program under a suitable Cooperative R&D Agreement.

3. (U) FY 1993 PLANS:

a. (U) Point Defense: Continue superresolution technology investigations with development of brassboard multi-port antenna and real-time processor; conduct bread-board tests of EO multi-target tracker; continue low-cost self-defense weapon technologies. Complete 3-D IR dim target algorithms; complete integration of point defense sensors; field test advanced shipIRST and transition to Advanced Technology Demonstration (ATD); continue environmental effects EM/EO analysis and modelling; identify low-cost self-defense weapon system technologies for non-combatants.

b. (U) Wide Area Surveillance: Test wideband AEW radar; begin development of sensors; test low-cost shipboard HPDF system; begin ground testing of space EO Interferometer.

c. (U) Area Surveillance: Integrate and test point defense sensors; transition airborne IR/EO sensor; demo automatic ship classifier; demo air-target ID algorithms; implement radar counter-ARM techniques; transition advanced air-surveillance ship radar.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602111N

PROGRAM ELEMENT TITLE: ANTI-AIR/ANTI-SURFACE WARFARE TECHNOLOGY

PROJECT NUMBER: N/A

BUDGET ACTIVITY: 1

TECHNOLOGY

PROJECT TITLE: N/A

d. (U) Air Superiority: Conduct Hardware-in-the-Loop (HWIL) simulations of LOAL G&C components; continue close-encounter ordnance investigations; continue situational awareness technology development; continue guidance-integrated fuze efforts; fabricate and test a 25mm diameter, 1mm thick diamond IR dome; initiate affordable missile G&C investigations in the areas of re-useable G&C software and advanced solid-state strapdown inertial measurement components.

e. (U) ASUW/Strike Weaponry: Test breadboard active-array, multi-mode autonomous anti-ship seeker; conduct airborne testing of real-time multi-sensor correlation algorithms; accelerate development of real-time mission planning and autonomous guidance technologies for Joint Air/Land/Sea Precision Strike Demonstration; begin development of low-cost 3-axis fiber-optic-on-a-chip Inertial Measurement Unit (IMU).

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN HOUSE: Naval Air Warfare Center, Warminster, PA and China Lake, CA; Naval Surface Warfare Center, White Oak, MD; Naval Command Control and Ocean Surveillance Center, San Diego, CA; Naval Research Laboratory, Washington D.C. CONTRACTORS: APL/JHU, Baltimore, MD; QuesTech, Inc., Falls Church, VA; Hughes Aircraft Co., Fullerton, CA; TRW, Redondo Beach, CA; Ferranti, Manchester, UK; Westinghouse, Baltimore, MD; M.I.T. Lincoln Lab, Lexington, MA.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not Applicable.

2. (U) SCHEDULE CHANGES: Not Applicable.

3. (U) COST CHANGES: An increase of \$14.5M in FY 1993 reflects an increase of \$6M for Defense Business Operations Fund operating costs and miscellaneous financial adjustments. Of the remaining increase, \$4M will be used to support the Joint Air/Land/Sea Precision Strike Demonstration under the Defense S&T Thrust in Precision Strike, \$3M will be used for affordable missile guidance and control technology under Defense S&T Thrust in Technology for Affordability, and \$1.5M will be used to augment ongoing work in reducing the IR signature of tactical missile plume.

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

G. (U) RELATED ACTIVITIES: This program adheres to Tri-Service Reliance agreements on conventional air/surface weaponry, directed energy weaponry, Electro-Optics (EO), electronic devices, radar and space (sensors) with oversight provided by the Joint Directors of Laboratories. Work in this program element is related to and fully coordinated with efforts in the following program elements: 1) Wide Area Surveillance Radar - PE 0602111N, PE 0601102F, PE 0602702F, PE 0602302F, PE 0602102F, PE 0602101F, PE 0602203F, PE 0603789F, PE 0603428F, PE 0603741D; 2) Air Intercept and Strike Radar - PE 0602782A, PE 0602111N, PE 0603217N, PE 0603109N, PE 0603214N, PE 0603253F, PE 0603203F, PE 0602204F, PE 0601101F, PE 0605502F, PE 0603227E, PE 0605502M, PE 0602712E; 3) Air-Air and Anti-Surface EO - PE 0602709A, PE 0603710A, PE 0602111N, PE 0603792N, PE 0602204F, PE 0603203F, PE 0603253F, PE 0603270F; 4) Conventional Air/Surface Weaponry - PE 0602618A, PE 0602624A, PE 0603004A, PE 0602303A, PE 0602111N, PE 0603601N, PE 0603306N, PE 0603609N, PE 0603318N, PE 0602203F, PE 0602602F, PE 0602302F, PE 0602601F, PE 0603216F, PE 0603790D, PE 0603640M; 5) Directed Energy Weaponry - PE 0602120A, PE 0602709A, PE 0602601F, PE 0603605F. This is in accordance with the ongoing Reliance joint planning process and contains no unwarranted duplication of effort among the Military Departments. Other related activities within the Navy: PE 0602234N Systems Support Technology and PE 0603792N Advanced Technology Transition.

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602121N

BUDGET ACTIVITY: 1

PROGRAM ELEMENT TITLE: SURFACE SHIP TECHNOLOGY

PROJECT NUMBER: N/A

PROJECT TITLE: N/A

A. (U) RESOURCES: (Dollars in Thousands)

TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Surface Ship Technology	16,505	31,922	26,113	CONT.	CONT.

B. (U) DESCRIPTION: This element develops Hull, Machinery and Electrical (HME) technology to (1) reduce detectability and targetability for all ships, (2) increase ability of ships to absorb combat damage and fight hurt, (3) increase ship volume of operations in all weather conditions and (4) allow more efficient, affordable warships. It also addresses surface ship combat control of Anti-Submarine Warfare (ASW). Project areas presently being pursued include: electromagnetic compatibility, signature reduction, advanced hull systems, damage control, advanced propulsion and machinery, and tactical decision aids development for surface ship ASW.

(U) This element supports the following DOD Critical Technologies: Semiconductor Materials and Microelectronics, Simulation and Modeling, Photonics, Passive Sensors, Signature Control, Machine Intelligence/Robotics, Computational Fluid Dynamics, Pulsed Power, Composite Materials, and Superconductivity.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Completed field algorithm for electrically thin magnetic and organic composite material systems.
- b. (U) Transitioned advanced degaussing technology to advanced development for Mine Counter Measures and Mine Sweeper Hunter ships' signature reduction.
- c. (U) Transitioned high-cavitation-inception-speed propulsors technology to funded demonstration program.
- d. (U) Conducted at-sea testing of first breadboard of autonomous structural data acquisition system aboard T-ACOS-19.
- e. (U) Conducted full-scale simulated nuclear blast test of sandwich configuration deckhouse panel under the continuing Defense Nuclear Agency, United Kingdom, and Canada test series.
- f. (U) Initiated control algorithm development for various power distribution options in Navy's Advanced Ship Machinery Systems Initiative.
- g. (U) Completed concept evaluation of composite diesel engine.
- h. (U) Utilized full-scale advanced development program shipboard test results to validate fire and smoke-spread model.
- i. (U) Initiated development of electro-optic/electromagnetic environment monitoring concept.

2. (U) FY 1992 PROGRAM:

- a. (U) Initiate feasibility study of fuel cells utilizing diesel fuel for ship service and propulsion power.
- b. (U) Initiate development of lightweight composite armor concepts.
- c. (U) Initiate interference model development for conformal multi-beam antenna array for Extremely-High-Frequency satellite communication.
- d. (U) Demonstrate feasibility of non-fluorocarbon fire-suppression agents.
- e. (U) Complete analytical model for missile debris and residual fuel damage.
- f. (U) Transition non-linear whipping (underwater blast) damage-prediction model to advanced development.

FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602121N
 PROGRAM ELEMENT TITLE: SURFACE SHIP TECHNOLOGY
 PROJECT NUMBER: N/A

BUDGET ACTIVITY: 1
 PROJECT TITLE: N/A

g. (U) Implement technology program for commercial and Navy unidirectional double hull ship designs per Congressional direction. Specifically:

- (1) Demonstrate affordable manufacturing, inspection, and preservation methods;
- (2) Develop structural design methods for environmental loads and demonstrate resistance to structural failures including grounding;
- (3) Demonstrate resistance to combat loads and develop improved methods for damage containment;
- (4) Develop and demonstrate total ship efficiency including hydrodynamic performance.

3. (U) FY 1993 PLANS:

- a. (U) Demonstrate combined anti-radiation coatings and hull transmission path blockers to reduce radiated noise signatures.
- b. (U) Demonstrate feasibility of light weight, low-observable glass-reinforced plastic mast concepts.
- c. (U) Complete cooperative effort with other North Atlantic Treaty Organization navies to improve dynamic stability of ships in rough seas.
- d. (U) Complete analytical model for reduced-wake hull forms.
- e. (U) Demonstrate feasibility of minimizing magnetic signature of composite diesel engine.
- f. (U) Complete shipboard smoke-spread analysis model.
- g. (U) Transition damage-control sensor guidelines to ship combat survivability program.
- h. (U) Complete ship dynamic stability guidelines.
- i. (U) Demonstrate feasibility of advanced material transporter concept.
- j. (U) Transition Light Airborne Multi-Purpose System (LAMPS) MK-III sonobuoy placement decisions aid to Advanced Technology Demonstrations and incorporate MK-50 torpedo performance modeling in tactical decision aids.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Naval Surface Warfare Center, Bethesda, MD, Panama City, FL; Naval Research Laboratory, Washington D. C. and Bay St. Louis, MS; Naval Command, Control and Ocean Surveillance Center, San Diego, CA. CONTRACTORS: Ball Brothers Research Corporation, Boulder, CO; General Electric Company, Schenectady, NY; Polimotors Corporation, Passaic, NJ; Purdue University, West Lafayette, IN; University of Houston, Houston, TX; Westinghouse, Pittsburgh, PA.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.
2. (U) SCHEDULE CHANGES: Not applicable.
3. (U) COST CHANGES: An increase of \$8.7M in FY 1993 reflects an increase of approximately \$1.9M for Defense Business Operations Fund (DBOF) operating costs. The remaining increase reflects the cost of the surface ship combat control task transferred to this PE from PE 0602314N, and an increased emphasis on affordability options for the Navy's Advanced Ship Machinery Systems initiative, ship structures, and damage control for ship survivability.

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602121N

BUDGET ACTIVITY: 1

PROGRAM ELEMENT TITLE: SURFACE SHIP TECHNOLOGY

PROJECT NUMBER: N/A

PROJECT TITLE: N/A

G. (U) RELATED ACTIVITIES: PE 0602131M, Marine Corps Landing Force Technology; PE 0602233N, Mission Support Technology; PE 0602234N, Systems Support Technology; PE 0602315N, Mine and Special Warfare Technology; PE 0602323N, Submarine Technology; PE 0602936N, Independent Exploratory Development; PE 0603502N, Surface Mine Countermeasures; PE 0603508N, Ship Propulsion Systems; PE 0603513N, Shipboard Systems Component Development; PE 0603514N, Ship Combat Survivability ; PE 0603553N, Surface ASW; PE 0603564N, Ship Development; PE 0603573N, Electric Drive; and PE 0603724N, Navy Energy Program.

(U) Under Tri-Service Reliance agreement, the Navy has the lead for this Navy-unique program. Work in this program element contains no unwarranted duplication of effort among Military Departments.

H. (U) OTHER APPROPRIATION FUNDS: None.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602122N
 PROGRAM ELEMENT TITLE: AIRCRAFT TECHNOLOGY
 PROJECT NUMBER: N/A

BUDGET ACTIVITY: 1
 PROJECT TITLE: N/A

A. (U) RESOURCES: (Dollars in Thousands)

TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Aircraft Technology	19,606	18,896	25,821	CONT.	CONT.

B. (U) DESCRIPTION: This program develops technology for naval aviation, with emphasis on the demands imposed by aircraft carrier flight operations and Marine Corps amphibious and field operations. This program exploits the emerging technologies of (a) composite and matrix materials for structures to reduce airframe and propulsion-plant weight and the effects of saltwater corrosion; (b) reduced observable aerodynamic designs of Navy-unique aircraft components; (c) advanced gas-turbine engine component designs for extended range/endurance; and (d) longer service life to bring about reduced at-sea replacements and spare inventory. Technologies are developed for needed upgrades to shipboard and arresting-gear systems, visual landing aids for safer flight operations, and aircraft maintenance test equipment for increased weapon system availability. The program provides mission area analysis and concept definition required for the Exploratory Development phase of air vehicle and weapon system program. Technologies are also developed for aviation test and evaluation systems.

(U) This element adheres to Tri-Service Reliance Agreements and supports the following DOD Critical Technologies: Software Producibility, Parallel Computer Architectures, Robotics, Simulation and Modeling, Photonics, Passive Sensors, Signal Processing, Signature Control, Data Fusion, Computational Fluid Dynamics, Air-Breathing Propulsion, and Composite Materials.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Fabricated the swept aero core engine compressor as part of Integrated High Performance Turbine Engine Technology (IHPTET) program. A highly effective combustor design using floatwall liner technology has been constructed, incorporated and successfully run in the Pratt and Whitney F-119 engine. Successfully demonstrated aircraft engine fuel injectors that have a five-fold increase in thermal insulation capability.

b. (U) Developed a simulation model for cockpit capsules for future aircraft. The model will be transitioned to support the Navy's Advanced Technology Crew Station and Escape programs and the Air Force's Advanced Aircraft/Crew Station programs.

c. (U) Tested miniature displays for helmet-mounted displays. An initial prototype of the next generation of magnetic head tracker was built. This technology has the potential to be incorporated in most Navy aircraft, including high-performance aircraft.

d. (U) Tested a Heads-Up Display Up-Front Control Panel in a simulator. This Panel could be retro-fitted in the F-18 and other aircraft cockpits and will influence the design of future cockpits.

e. (U) Demonstrated tip-jet nozzles for future vertical flight aircraft. The rotor could be stopped and used as a conventional wing, which would allow the future vertical aircraft to loiter at an altitude higher than normal helo altitudes.

f. (U) Transitioned Test Generator with Inferred Reasoning to avionics test stations. The equipment will be used to speed testing of aircraft electronics in both the Navy and Air Force. Radars will probably be the first to be impacted by the Test Generator.

FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602122N
 PROGRAM ELEMENT TITLE: AIRCRAFT TECHNOLOGY
 PROJECT NUMBER: N/A

BUDGET ACTIVITY: 1
 PROJECT TITLE: N/A

2. (U) FY 1992 PROGRAM:

a. (U) Build non-intrusive engine turbine inlet sensors for IHPTET program. Lighter weight, more efficient control systems capable of operation in more severe engine and aircraft environments will improve propulsion system thrust/weight and specific fuel consumption performance and reduce susceptibility to countermeasures.

b. (U) Evaluate performance of an integrated crewstation in a capsule. Man-machine interfaces will be improved through the use of computer models to realistically define and assess aircrew interface requirements.

c. (U) Test advanced helmet-mounted display visor optics. Visual display performance, head tracking, positive pressure breathing and multi-wavelength laser eye protection will be systematically integrated with the helmet-mounted display optical component.

d. (U) Design a flight-control system which incorporates neural networks. Flight control computer complexity and hardware/software support costs would be potentially reduced through application of neural networks.

e. (U) Develop concept for generic autonomous vehicles for carrier deck equipment applications. Technologies being developed by NRL, DOE, and DARPA would be used for autonomous fire fighting, Chemical Biological Radiation (CBR) decontamination, and weapons loading and handling.

f. (U) Start developing the tactical utility of agility for Navy aircraft based upon DARPA's X-31A Enhanced Fighter Maneuverability aircraft.

3. (U) FY 1993 PLANS:

a. (U) Complete Advanced Subsonic Turbine Engine Technology turbine design for IHPTET program. Research is focused on increased temperature capability, advanced cooling schemes, and the incorporation of next generation single materials and thermal barrier coatings. The turbine will contribute to the IHPTET initiative, which has as its goal the doubling of propulsion performance capability by the year 2003.

b. (U) Conduct a systems evaluation of the Advanced Technology Cockpit. Incorporation of an articulating seat for improved G protection, integration of movable flat-panel displays, laser sequencing for aircrew escape systems, improved high speed escape and anti-exposure through use of a crew module, and improved severance of composite materials during initial ejection are being evaluated.

c. (U) Test the capabilities of flight controls against high-power microwaves. This will demonstrate the capability to operate without degradation at extremely high ambient electromagnetic flux levels (i.e., counter radio-frequency weapons).

d. (U) Transition aircraft battle damage technology to Navy repair and training facilities. Performing repairs on composite structures at field maintenance levels results in cost and manpower savings and increases operational readiness. The Agility Aircraft Life Extension Program will also reduce rework of damage-prone parts and increase service life.

e. (U) Develop automated rapid aircraft-turn-around capability for carriers and air-capable ships. Directly following aircraft recovery, rapid turnaround will perform a quick assessment of aircraft status to determine the optimal route for servicing and maintenance. Improvements in each step of the turnaround process will increase sortie rates, improve warfighting capability, and enhance mission flexibility.

f. (U) Continue X-31A agility development for Navy applications. The X-31 will demonstrate new close-in combat capabilities utilizing the effectiveness and increased agility of enhanced maneuverability, demonstrate an increase in tactical exchange ratios, and verify design requirements in applying X-31 concepts to future advanced fighter designs.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602122N
PROGRAM ELEMENT TITLE: AIRCRAFT TECHNOLOGY
PROJECT NUMBER: N/A

BUDGET ACTIVITY: 1
PROJECT TITLE: N/A

D. (U) WORK PERFORMED BY: IN-HOUSE: Naval Air Warfare Center, Warminster, PA, Trenton and Lakehurst, NJ, China Lake, CA; Naval Surface Warfare Center, Bethesda and Indian Head, MD; Naval Research Laboratory, Washington, D. C. CONTRACTORS: General Electric, Lynn, MA; McDonnell-Douglas Corporation, St. Louis, MO; Pratt-Whitney Engines, East Hartford, CT; Rockwell International, Columbus, OH; Boeing Aircraft Corporation, Seattle, WA.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.
2. (U) SCHEDULE CHANGES: Not applicable
3. (U) COST CHANGES: An increase of \$1.4M reflects the net of a decrease of \$2M to reflect the extension of FY 1992 Congressional action into FY 1993 and an increase of \$3.4M for Defense Business Operations Fund (DBOF) operating costs and miscellaneous financial adjustments.

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

G. (U) RELATED ACTIVITIES: This program adheres to Tri-Service Reliance Agreements on Air Vehicles (Fixed), Air Vehicles (Rotary), and Aeropropulsion with oversight provided by the Joint Directors of Laboratories. Work in this Program Element is related to and fully coordinated with efforts in PE 0601101F, PE 0601102F, PE 0601153M, PE 0602201F, PE 0602202F, PE 0602204F, PE 0602233N, PE 0602234N, PE 0602936N, PE 0603109F, PE 0603112F, PE 0603202F, PE 0603205F, PE 0603211F, PE 0603216F, PE 0603231F, PE 0603245F, PE 0603701N, PE 0603706N, PE 0603727F, and PE 0603792N in accordance with the ongoing Reliance joint planning process and contains no unwarranted duplication of effort among the Military Departments.

H. (U) OTHER APPROPRIATION FUNDS: None.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602131M

BUDGET ACTIVITY: 1

PROGRAM ELEMENT TITLE: MARINE CORPS LANDING FORCE TECHNOLOGY

PROJECT NUMBER: N.A.

PROJECT TITLE: N.A.

A. (U) RESOURCES: (Dollars in Thousands)

TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Marine Corps Landing Force Technology	16,906	17,952	21,019	CONT.	CONT.

B. (U) DESCRIPTION: This is the only DoD Exploratory Development program that develops the technologies needed to support unique Marine Corps expeditionary capabilities and the requirement to operate in a variety of climates and tactical scenarios worldwide, including the conduct of amphibious operations, contingency operations, and Special Operations. This Program Element (PE) supports the DOD Science and Technology Strategy in Advanced Land Combat Vehicles. It also supports the DOD Critical Technologies plan in the following areas: Simulation and Modeling, Passive Sensors, Signal Processing, Signature Control, Data Fusion, High-Energy Density Materials, Composite Materials, and Biotechnology. Specific requirement documents are the Marine Air Ground Task Force Master Plan (MAGTFMP), the Marine Corps Long Range Plan (MLRP), and the Marine Corps Campaign Plan (MCCP). This PE contains projects in various disciplines. All projects are continuous but individual tasks vary to align emerging requirements with evolving technology.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) SURFACE MOBILITY TECHNOLOGY

1. (U) FY 1991 ACCOMPLISHMENTS: Transitioned Ka-5502 Diesel Engine Technology to Advanced Amphibious Assault Vehicle (AAAV) program; development testing initiated. Completed Turbo Roto Compound (TRC) Monocylinder Test Rig cold testing; initiated hot testing. Terminated Water Piston Propulsion task.

2. (U) FY 1992 PROGRAM: Explore alternative vehicle concepts for year 2010 and beyond. Develop modular vehicle family employing common system components and subsystems and mission-dependent modularization concepts. Support joint program with U.S. Navy for advanced material transporter.

3. (U) FY 1993 PLANS: Transition Technology for Advanced Propulsion to Advanced Technology Demonstration (ATD) under PE 0603640M. Continue investigation of Advanced Surface Mobility Concepts for both Amphibian and Wheeled Vehicle.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

(U) CHEMICAL/BIOLOGICAL DEFENSE TECHNOLOGY

1. (U) FY 1991 ACCOMPLISHMENTS: Completed fabrication of prototype lightweight mask candidates; Micro Forward Looking Infrared (FLIR) upgrade; interior vehicle working scenario assessment. Optimized and evaluated foam decon technology. Lightweight suits prototyped and tested. Deployed prototype bio detector to Southwest Asia (SWA).

2. (U) FY 1992 PROGRAM: Initiate enzymatic decon effort. Continue filtration efforts. Evaluate onboard detection/hybrid filtration/decon concepts for vehicles. Transition: reactive and flocked materials to ATD, PE 0603640M; protective boot elastomers/assault mask to ATD, PE 0603640M; FLIR detectors to the U.S. Army Night Vision Laboratory (USA NVL).

3. (U) FY 1993 PLANS: Continue Chem/Bio Defense technologies for vehicles. Transition sorbent/foam decon material/dispensers/filtration technology, and filter canisters to ATD, PE 0603640M.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602131M

BUDGET ACTIVITY: 1

PROGRAM ELEMENT TITLE: MARINE CORPS LANDING FORCE TECHNOLOGY

PROJECT NUMBER: N.A.

PROJECT TITLE: N.A.

(U) MINE DETECTION AND MINE COUNTERMEASURES TECHNOLOGY

1. (U) FY 1991 ACCOMPLISHMENTS: Optimized Distributed Explosive deployment method. Initiated sensor/decoy integration and fabrication of testbed/Multi-Spectral Sensing Detector optical system for Stand-off Mine Detection. Completed initial D7G bulldozer flail testing. Extensive field testing of Mine Detection and Surveillance (MIDAS) testbed conducted in support of Airborne Mine Detection/Surveillance System (AMDAS). Terminated Magneto-Hydrodynamic (MHD) effort as not feasible.

2. (U) FY 1992 PROGRAM: Complete underwater explosive array testing and transition to USN. Complete fabrication/integration of sensor/decoy/testbed for Wide Area Mine Clearance (WAMC) and conduct demo. Continue multispectral imaging effort in Surface Mine Detection Ground (SMDG).

3. (U) FY 1993 PLANS: Test/Evaluate prototype model distributed explosives array against surrogate threat. Transition technology to Stand-Off Mine Detection, Ground ATD (PE 0603640M). Complete predictive modeling and develop prototype countermeasure system in WAMC. Conduct scale test on plow concepts.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

(U) BATTLEFIELD ELECTRONIC SUPPORT TECHNOLOGY

1. (U) FY 1991 ACCOMPLISHMENTS: Completed Two-station demonstration of Command Information Processor (CIP). Began development of improved interrogation devices. Completed Forward Observer Technology effort and transitioned to PE 0603640. Transitioned networking technology to Amphibious Assault Networking ATD (PE 0603640M).

2. (U) FY 1992 PROGRAM: Demonstrate and transition CIP; expand application software. Transition interrogation technology to C2, 2000 ATD (PE 0603640M). Continue investigations of communications concepts.

3. (U) FY 1993 PLANS: Complete analyses, design, and feasibility testing of wideband digital data links. Continue Marine Corps Tactical Command and Control System (MTACCS) effort in data links.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

(U) MARINE AIR-GROUND TASK FORCE (MAGTF) SURVIVABILITY TECHNOLOGY (MST)

1. (U) FY 1991 ACCOMPLISHMENTS: Tested D7G countermine flail and made available for Operation Desert Storm. Characterized ballistic protective fabrics. Demonstrated decoy/deception devices. Analyzed explosive blast-resistant vehicle bodies.

2. (U) FY 1992 PROGRAM: Transition flail to PE 0603640M. Perform functional evaluation of Protective fabrics and transition to PE 0603640M.

3. (U) FY 1993 PLANS: Continue investigation into survivability support for all projects in PE 0602131M.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

(U) ADVANCED AMPHIBIOUS LOGISTICS TECHNOLOGY

1. (U) FY 1991 ACCOMPLISHMENTS: Initiated concept exploration baseline for future Amphibious Logistics Concepts. Formed joint steering committee. Completed technology search. Published report.

2. (U) FY 1992 PROGRAM: Complete concept exploration. Establish system tasks.

3. (U) FY 1993 PLANS: Initiate feasibility investigations of logistic concepts to support Over-the-Horizon operations.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

(U) WEAPONRY TECHNOLOGY

1. (U) FY 1991 ACCOMPLISHMENTS: Completed critical experiments in fragmentation concepts and hypergolic alloys against energetic material targets. Began three new initiatives; started and terminated Advanced Helicopter Gun System (AHGS). Completed Lightweight 155mm Howitzer test. Developed operational concept for Light Armored Vehicle-Air Defense (LAV-AD).

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602131M

BUDGET ACTIVITY: 1

PROGRAM ELEMENT TITLE: MARINE CORPS LANDING FORCE TECHNOLOGY

PROJECT NUMBER: N.A.

PROJECT TITLE: N.A.

Completed and transitioned Multi-Mode marker. Completed mortar baseplate effort. Initiated Advanced Lightweight Ground Weaponry (ALGW) and Special Purpose Weaponry (SPW) efforts in support of Special Operations/Low Intensity Conflict (SOLIC).

2. (U) FY 1992 PROGRAM: Demonstrate improved armor penetration with initiation charge design and initial capability of man-in-loop Automated Target Detection and Identification System (ATDIS) and autonomous sensing aided by neural network. Continue sensor integration and data fusion effort with AAW sensors/neural network. Initiate concepts for Vertical Assault Support (VAS) operations and battlefield identification systems. Develop and model concepts for Advanced Processors for Weapons Sensor Fusion (APWSF).

3. (U) FY 1993 PLANS: Demonstrate ATDIS/transition to ALGW ATD. Initiate tasks on emerging requirements for gun-launched acoustic sensors, chemlite battlefield marker rounds, and "shoot and scoot" 120mm LAV mortar. Demonstrate prototype battlefield identification systems and transition to Balanced Technology Initiative (BTI) projects. Continue VAS task development.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

(U) MANPOWER AND TRAINING TECHNOLOGY

1. (U) FY 1991 ACCOMPLISHMENTS: Integrated weapons simulator with neuroelectric testing system and collected data/refined performance measures. Transitioned Force Management Forecasting. Established correlations between marksmanship and neuroelectric waveforms. Identified range of Over the Horizon (OTH) training requirements.

2. (U) FY 1992 PROGRAM: Continue FY 1991 neuroelectric predictors effort. Model systematic relationships. Develop mathematical models to estimate attrition. Provide technical support to OTH efforts.

3. (U) FY 1993 PLANS: Design field validation of models in quality of life effort. Develop OTH gaming specs, prototypes, and scenarios. Complete attrition model in manpower management.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: MARCORSYSCOM Quantico, Va; NPRDC, San Diego, CA; Harry Diamond Labs, Adelphi, MD; Naval Surface Warfare Center, Carderock, MD, Dahlgren, VA, and Panama City, FL; NCEL, Port Hueneme, CA; Naval Air Warfare Center, China Lake, CA; NRL, Washington D. C.; Dept. of Energy, Las Vegas, NV, Los Alamos, NM, Idaho Falls, ID; LANL, Los Alamos, NM. CONTRACTORS: SAIC, General Dynamics and Solar Turbines, San Diego, CA; AAI Corp, Hunt Valley, MD; MTU Corporation, Friedrichshafen, FGR; EASI, St. Louis, MO; Aardvark, Aberdeen Scotland; APL/University of Washington, Seattle, WA.

E. (U) COMPARISON WITH FY 1992/93 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not Applicable.

2. (U) Schedule Changes: Not Applicable.

3. (U) COST CHANGES: An increase of \$1.9M in FY 1993 reflects an increase for Defense Business Operations Fund operating costs.

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

G. (U) RELATED ACTIVITIES: This program is conducted in accordance with the ongoing Reliance planning process and contains no unwarranted duplication of effort among the military Departments. Related activities are: PE 0602232N C3 Technology; PE 0604818A, Army Tactical Command and Control; PE 0602121N Surface Ship Technology.

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602232N

BUDGET ACTIVITY: 1

PROGRAM ELEMENT TITLE: COMMAND, CONTROL AND COMMUNICATIONS TECHNOLOGY

PROJECT NUMBER: N/A

PROJECT TITLE: N/A

A. (U) RESOURCES: (Dollars in Thousands)

TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Command, Control and Communications Technology	17,802	14,918	22,627	CONT.	CONT.

B. (U) DESCRIPTION: This program provides the technologies needed by the primary warfare areas to develop more survivable Command, Control, and Communications (C3) systems, secure communications, tactical communications interoperability, timely data fusion, decision aids and accurate navigation. Present emphasis in joint operations requires, as a high priority, Joint Service/NATO tactical C3 systems interoperability. Operation Desert Storm also refocused on priority needs in higher communications capacity and high volume information management.

(U) This element adheres to Tri-Service Reliance Agreements, supports the DoD Critical Technology Plan in Data Fusion, and is coordinated through the Joint Directors of Laboratories Technology Panel for C3, and supports the DoD Service Technology Thrust in Global Surveillance.

(U) Program implements, in cooperation with Army and Air Force under the Joint Director of Laboratories Technology Panel for C3, the C3 technology demonstrations identified by the Defense Department Research & Engineering (DDR&E) Science & Technology (S&T) Panel on Global Surveillance and Communications.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) C3 SYSTEM ARCHITECTURE

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Developed simulation model and analyzed network routing algorithms in realistic tactical scenarios.

b. (U) Developed simulation of the reliable multicast protocol for connectionless service in an open systems interconnect environment.

c. (U) Established the notional architecture for the next generation attack submarine radio room for compatibility with the Communication Support System architecture.

2. (U) FY 1992 PROGRAM:

a. (U) Further enhance network routing and access protocols for more efficient data throughput and to accommodate dynamic network membership.

b. (U) Develop a new battlegroup sub-network architecture utilizing higher capacity super-high-frequency (SHF) links capable out to extended line-of-sight ranges.

c. (U) Extend ultra-high-frequency line-of-sight network routing and access protocols to include attack submarines participating in the battlegroup network.

3. (U) FY 1993 PLANS:

a. (U) Develop the software interface to the Modular Security Device for embedded network encryption.

b. (U) Determine needed network algorithms and evaluate applicability of the Air Force multi-resource controller for the SHF sub-network.

c. (U) Extend development of attack submarine network routing and access protocols to other radio-frequency bands such as High-Frequency (HF) and SHF.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602232N

BUDGET ACTIVITY: 1

PROGRAM ELEMENT TITLE: COMMAND, CONTROL AND COMMUNICATIONS TECHNOLOGY

PROJECT NUMBER: N/A

PROJECT TITLE: N/A

(U) COMMUNICATIONS

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Completed final design for the metastable atomic resonance filter for submarine laser communications.
- b. (U) Conducted successful tests of submarine communications in the arctic.
- c. (U) Demonstrated feasibility of frequency agility for very-low-frequency submarine communications at the Chollas Heights low-frequency transmitter facility.
- d. (U) Conducted SHF antenna investigation to determine technical options for a high-capacity ship-to-ship troposcatter link.
- e. (U) In cooperation with the Air Force, initiated design and fabrication of a breadboard low-probability-of-intercept (LPI) airborne communication system.

2. (U) FY 1992 PROGRAM:

- a. (U) Design, build and test prototype buoy-deployable antennas for submarine communications in the arctic.
- b. (U) Initiate investigation into extremely-low-frequency (ELF) submarine communications employing antennas operating in the corona mode.
- c. (U) Investigate potential for replacing SHF dish antennas with multiband antenna array for ship applications.
- d. (U) In cooperation with the Air Force extend the adaptive locally optimum processing technique to the HF band and determine its potential applicability to the joint Service (AF/Army/Navy) multiband, multimode radio program.
- e. (U) Complete fabrication and test of the joint (AF/Navy) LPI airborne communication system.

3. (U) FY 1993 PLANS:

- a. (U) Conduct lab measurements and demonstration of ELF corona-mode antennas.
- b. (U) Conduct at-sea demonstration of HF LPI waveform for submarine communications.
- c. (U) Determine feasibility of most promising approach for shipborne SHF multifunction phased-array antenna.
- d. (U) Initiate transition of the adaptive locally optimum processing algorithm to the joint-service multiband-multimode radio.
- e. (U) Transition the joint (AF/Navy) LPI airborne communication system to the Advanced Technology Demonstration (6.3A) program.
- f. (U) Transition the Advanced Digital anti-submarine warfare (ASW) receiver to the Advanced Technology Demonstration (6.3A) program.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

(U) COMMAND SUPPORT

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Deployed and operated successfully the Air Strike Planning Advisor in Operation Desert Storm, in supporting pre-mission weaponeering in a high-sortie-rate environment.
- b. (U) Deployed solid-state and optical disk memory technology in a variety of weapon systems in Operation Desert Storm.
- c. (U) In cooperation with the Army and Air Force, developed and demonstrated the distributed computing environment in a distributed technology experiment conducted over commercial telecommunication networks.
- d. (U) Transitioned the template-based situation assessment to the Army, National Security Agency, and the Navy Tactical Command System-Afloat (NTCS-A) program.
- e. (U) Transitioned the digital map generator to NTCS-A and the AEGIS program.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602232N

BUDGET ACTIVITY: 1

PROGRAM ELEMENT TITLE: COMMAND, CONTROL AND COMMUNICATIONS TECHNOLOGY

PROJECT NUMBER: N/A

PROJECT TITLE: N/A

2. (U) FY 1992 PROGRAM:
 - a. (U) Demonstrate the Express Transport Protocol (XTP) on a fiber-optic local area network.
 - b. (U) In cooperation with the Army and Air Force, demonstrate the use of distributed relational databases.
 - c. (U) Develop and demonstrate new data-compression strategy for the digital terrain-elevation display.
 - d. (U) Conduct experiments on selected signal processing algorithms using the Residue Numbering System.
3. (U) FY 1993 PLANS:
 - a. (U) Integrate the XTP on fiber-optic local area network with a real-time distributed operating system.
 - b. (U) Demonstrate prototypes of the trusted database management system and the trusted distributed operating system.
 - c. (U) Conduct at-sea demonstration of prototype ASW data quality monitoring system for the NTCS-A program in preparation for transition.
 - d. (U) Begin transition of 5.25 inch rewritable optical disk technology to deployment on military aircraft.
4. (U) PROGRAM TO COMPLETION: This is a continuing program.

(U) NAVIGATION

1. (U) FY 1991 ACCOMPLISHMENTS: In cooperation with the Air Force, completed van and flight tests of miniature tactical ring laser gyroscope for missile applications.
2. (U) FY 1992 PROGRAM: Complete lab evaluation of high-accuracy fiber-optic gyro.
3. (U) FY 1993 PLANS: Conduct at-sea evaluations of more accurate battlegroup navigation algorithms.
4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Naval Air Warfare Center, Warminster, PA and China Lake, CA; Naval Command Control and Ocean Surveillance Center, San Diego, CA; Naval Undersea Warfare Center, New London, CT; Naval Research Laboratory, Washington D.C.. CONTRACTORS: Bolt, Beranek and Newman, Cambridge, MA; Litton Industries, Los Angeles, CA; Carnegie Mellon University, Pittsburgh, PA; ERA, Vienna, VA; Metron, McLean, VA.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.
2. (U) SCHEDULE CHANGES: Not applicable.
3. (U) COST CHANGES: An increase of \$2.5M in FY 1993 reflects an increase for Defense Business Operations Fund operating costs and miscellaneous financial adjustments.

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

G. (U) RELATED ACTIVITIES: This program adheres to Tri-Service Reliance Agreements on Command, Control and Communications (C3) with oversight provided by the Joint Directors of Laboratories. Work in this Program Element is related to and fully coordinated with efforts in PE 0602782A (Command, Control and Communications (C3) Technology) and PE 0602702F (Command, Control and Communications) in accordance with the ongoing Reliance joint planning process and contains no unwarranted duplication of effort among the Military Departments.

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602233N
PROGRAM ELEMENT TITLE: MISSION SUPPORT TECHNOLOGY
PROJECT NUMBER: N/A

BUDGET ACTIVITY: 1
PROJECT TITLE: N/A

A. (U) RESOURCES: (Dollars in Thousands)

TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Mission Support Technology	34,505	29,818	36,118	CONT.	CONT.

B. (U) DESCRIPTION: This program element supports the DoD Science and Technology (S&T) Strategy in Simulation and Modeling, and Affordability. The program provides mission support technologies essential for all naval operations. Personnel and training technologies enhance the Navy's ability to select, assign and train people for highly demanding jobs. Personnel performance and safety technologies improve safety of operational personnel and enhance performance capabilities under adverse conditions. Chemical and Biological Defense (CBD) technologies improve the ability to respond to existing and future CBD threats. Logistics technologies increase operational readiness through effective management and movement of supplies ashore and at-sea and advanced techniques for more cost-effective construction and maintenance of shore and off-shore facilities. Environmental protection technologies will improve Navy-unique capabilities to meet air- and water-quality regulatory standards and to reduce toxic-waste generation.

(U) This element adheres to Tri-Service Reliance agreements and supports the DoD Critical Technologies Plan in Simulation and Modeling.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Introduced the Fiber Optic-based Bio-sensor for experimental use in Operation Desert Storm to detect enemy biological agents.

b. (U) Introduced Proximity/Structural Firefighter's Glove directly into the Fleet.

c. (U) Provided personal-computer-compatible chemical and biological hazard prediction model (chemical/biological agent vapor, liquid, and solid tracking (VLSTRACK)) to Fleet in Operation Desert Storm.

d. (U) Completed evaluation of a low-cost analysis and debrief system for air combat training, resulting in substantial cost savings and performance enhancement in Navy and Air Force applications.

e. (U) Completed development of a prototype desk-top simulator for training various aspects of radio navigation in a more cost-effective fashion.

f. (U) Developed and evaluated a computer model that was used to allocate FY92 recruiting resources more effectively.

g. (U) Developed methods to more accurately and economically determine environmental stress screening requirements for procurement of electronic spares.

h. (U) Demonstrated capability of the High Performance Magazine and transition to 6.3A Advanced Technology Demonstration Project.

2. (U) FY 1992 PROGRAM:

a. (U) Initiate development of physiologically-based pharmacokinetic (PBPK) model for toxicity evaluations of operationally required chemicals.

b. (U) Introduce abrasion-resistant aluminized fabrics into the Fleet.

c. (U) Complete evaluation of intermittent cooling systems for use aboard ship in hot spaces too confined for continuous use of microclimate cooling systems.

d. (U) Complete documentation and validation of VLSTRACK and transition to 6.3.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602233N
PROGRAM ELEMENT TITLE: MISSION SUPPORT TECHNOLOGY
PROJECT NUMBER: N/A

BUDGET ACTIVITY: 1
PROJECT TITLE: N/A

- e. (U) Begin evaluation of instructional strategies for improving individual and team tactical decision-making under stressful conditions.
- f. (U) Complete development of computer-based tools that reduce the development costs and improve the comprehensibility of instructional text.
- g. (U) Complete evaluation of techniques to improve individual and unit productivity in the Navy civilian workforce.
- h. (U) Provide a synthetic line fatigue model for long-term performance simulation for varied fleet applications.
- i. (U) Complete development of Hot Isostatic Processing (HIP) techniques to extend gas turbine blade life by 50% and increase time between overhauls by 25%.

3. (U) FY 1993 PLANS:

- a. (U) Complete development of the silicon-based sensor electrode for detection of a wide range of toxins.
- b. (U) Complete initial PSPK model and extend to additional high interest chemicals.
- c. (U) Complete and transition all technology information gathered during microclimate cooling system evaluations.
- d. (U) Begin evaluation of the effectiveness of virtual environment (artificial reality) simulation technology in a variety of low-cost training applications to maintain and enhance operator skills.
- e. (U) Complete development of simulation technology to improve training for mine detection and recognition using active sonar.
- f. (U) Complete development of software to optimize Naval enlisted personnel assignment decisions.
- g. (U) Complete development of techniques for improved training of aircrew coordination skills.
- h. (U) Complete development of new concepts in fuel tank design that will result in increased tank utilization and reduced fueling time.
- i. (U) Provide fiber optic numerical model to assist in laying sea-floor fiber optic cables.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Naval Air Warfare Center, Warminster, PA, and Trenton, NJ; Naval Surface Warfare Center, Dahlgren, VA, Panama City, FL, Bethesda, MD; Naval Command, Control and Ocean Surveillance Center, San Diego, CA; Naval Research Laboratory, Washington, D.C.; Naval Civil Engineering Laboratory, Port Hueneme, CA; Naval Medical Research Institute, Bethesda, MD; Naval Training Systems Center, Orlando, FL; Naval Personnel Research and Development Center, San Diego, CA. **CONTRACTORS:** Smithsonian Institution, Washington, DC; National Institute of Standards and Technology, Gaithersburg, MD; Carnegie-Mellon U., Pittsburgh, PA.; Scientific Management Associates, Landover, MD.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

- 1. (U) **TECHNOLOGY CHANGES:** None.
- 2. (U) **SCHEDULE CHANGES:** None.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602233N
PROGRAM ELEMENT TITLE: MISSION SUPPORT TECHNOLOGY
PROJECT NUMBER: N/A

BUDGET ACTIVITY: 1

PROJECT TITLE: N/A

3. (U) COST CHANGES: A decrease of \$1.9M reflects the net of decreases of \$5.0M to reflect the extension of FY 1992 Congressional action into FY 1993, \$4.3M for a transfer of medical development funds to OSD for consolidation, and the following increases: \$4.1M for Defense Business Operations Fund (DBOF) operating costs and miscellaneous financial adjustments, and a Departmental increase of \$3.3M, in support of the Defense S&T Thrust in Simulation and Training, to establish a simulation facility in Orlando, FL, for evaluation of a wide array of artificial reality (virtual environment) applications to training. The Orlando facility will have tri-Service utility and will support a coordinated R&D program on Virtual Environment Training Technology (VETT).

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: This program adheres to Tri-Service Reliance Agreements on Training Systems, Manpower & Personnel, Medical, Chemical & Biological defense, and Civil engineering. Oversight is provided by the Training and Personnel systems Science & Technology Evaluation & Management committee (TAPSTEM) for Training Systems and Manpower & Personnel programs; the Armed Services Biomedical Research Evaluation and Management (ASBREM) committee for Biomedical programs; the Joint Directors of Laboratories; the Joint Chemical Effects Data Research Guide (JCEDAR) and Joint Development Objectives Guide (JDOG) for CBD programs; and Joint Engineers for Civil engineering. Related program elements include PE 0602314N, Undersea Surveillance and Weapons Technology; PE 0602111N, AAW/ASUW Technology; PE 0602232N, Command, Control and Communications Technology, PE 0602131M, Marine Corps Landing Force Technology.

H. (U) OTHER APPROPRIATION FUNDS: None.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) MILESTONE SCHEDULE: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602234N

BUDGET ACTIVITY: 1

PROGRAM ELEMENT TITLE: SYSTEMS SUPPORT TECHNOLOGY

PROJECT NUMBER: N/A

PROJECT TITLE: N/A

A. (U) RESOURCES: (Dollars in Thousands)

TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Systems Support Technology	71,723	77,048	93,810	Cont.	Cont.

B. (U) DESCRIPTION: Materials, Electronic Devices, Computers and software, and Human Factors comprise this broad technology base program that provides the Navy with the capability, resources, and expertise to implement advanced weapon and platform system concepts. Materials and electronic devices are enabling technologies addressing fundamental systems limitations in performance, reliability and affordability. Computer technology includes hardware, software, machine intelligence, and software/systems engineering. Human Factors technology addresses high-payoff topics in man/machine interfaces, decision-making and information transfer.

(U) This element supports DoD Science and Technology (S&T) Strategy and the following DoD Critical Technologies: Micro-electronics, Software Producibility, Parallel Computer Architectures, Machine Intelligence and Robotics, Photonics, Sensitive Radars, Passive Sensors, Signal Processing, Composite Materials, Superconductivity, and Biotechnology. All work in this program is jointly planned by the Army, Navy, and Air Force in accordance with Tri-Service Reliance agreements.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Integrated sensing and control systems into "OSPREY" metal spray-forming unit to fabricate complex shapes.
- b. (U) Initiated development of advanced high-temperature bearing materials for turbine-engine applications.
- c. (U) Demonstrated thermal plane efficiency of high-thermal-conductivity composites in electronic packaging.
- d. (U) Demonstrated robust processing technology program for ceramic and metal matrix composites.
- e. (U) Designed and demonstrated advanced composite constraining core concept for electronic modules.
- f. (U) Demonstrated complementary heterojunction bipolar transistor push-pull amplifier at 20 GHz.
- g. (U) Demonstrated components of 128 x 64 vector-matrix multiplier.
- h. (U) Characterized Thulium/Holmium for energy transfer and upconversion.
- i. (U) Designed a multi-chip Artificial Neural Network for motion detection in high-noise environments.
- j. (U) Developed a software emulation of low-power/low-weight digital signal processors.
- k. (U) Started evaluation of commercial Computer-Aided Design/Computer-Aided Engineering (CAD/CAE) tools for large-scale, complex Navy Systems.
- l. (U) Began evaluation of display techniques for rapid review of large volumes of undersea surveillance data.
- m. (U) Developed an advanced technique for capturing and manipulating target information on command and control systems.

2. (U) FY 1992 PROGRAM:

- a. (U) Transition high-thermal-conductivity composites technology to the SHARP program for use in the standard electronic module-E (SEM-E).
- b. (U) Demonstrate process technology and material reproducibility

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602234N

BUDGET ACTIVITY: 1

PROGRAM ELEMENT TITLE: SYSTEMS SUPPORT TECHNOLOGY

PROJECT NUMBER: N/A

PROJECT TITLE: N/A

for ceramic and metal matrix composites.

c. (U) Start major new Tri-Service initiative on radio-frequency (RF) Vacuum Electronics Technology. The Program will consist of five major projects:

Microwave Power Modules - hybrid solid state/vacuum tube modules for high power active array applications.

Computational Techniques - advanced computer-aided design methods for the Power Tube industry.

High-Performance Millimeter Wave Devices - devices to extend radio frequency spectrum utilization.

Design for Low Cost - design methods to reduce the cost of tubes for electronic decoys.

Vacuum Microelectronics - an emerging technology for building a wide variety of electronic devices based on microminiature field-emitting arrays.

d. (U) Demonstrate a 100 x 100 neural network, self-learning array.

e. (U) Demonstrate acousto-optic (A-O) Bragg cell and heterodyne detector array and magnetostatic wave (MSW) channelized receiver for Electronic Warfare applications.

f. (U) Demonstrate transistors fabricated in silicon-on-insulator with a buried-conductor technology which is extendable to 3D Integrated Circuits.

g. (U) Complete a demonstration version of low-power/low-weight digital signal processor.

h. (U) Develop a solid state laser diode array pump that is temperature insensitive over the military environment.

i. (U) Develop prototype designs for CAD/CAE tools for large-scale, complex Navy systems.

j. (U) Complete evaluation of neurophysiological techniques to predict operator decrement due to fatigue and workload.

k. (U) Begin development of guidelines for adaptive function allocation between pilots and intelligent automated systems.

3. (U) FY 1993 PLANS:

a. (U) Complete Phase 1 of robust processing of advanced composites initiative.

b. (U) Complete development of thin-walled, lightweight carbon-carbon spacecraft truss structure.

c. (U) Select intermetallic materials for performance demonstrations in generation-six integrated high performance turbine engine technology.

d. (U) Demonstrate a free-standing diamond sensor window for tactical missiles.

e. (U) Complete hydrostatic bearing development for eliminating noise in main-shaft submarine bearings.

f. (U) Demonstrate high performance torpedo warhead material.

g. (U) Demonstrate a 16-bit, 125-Megasample/sec (MS/sec) A/D converter in a dual-chip, single-package configuration.

h. (U) Continue Navy-lead, Tri-Service initiative on RF Vacuum Electronics Technology.

i. (U) Demonstrate a 300 W peak (10 W average) impact, avalanche, transit-time (IMPATT) power source at W band.

j. (U) Complete monolithic receiver front-end for airborne radio.

k. (U) Complete development of Strategies for Discourse Modelling for Computerized Natural Language Processing.

l. (U) Demonstrate computer learning with multiple threats via simulation of a multi-plane dogfight.

m. (U) Complete development of an intelligent tutoring technique to reduce training instructor workload.

n. (U) Complete development of space/time neural network simulation

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602234N

BUDGET ACTIVITY: 1

PROGRAM ELEMENT TITLE: SYSTEMS SUPPORT TECHNOLOGY

PROJECT NUMBER: N/A

PROJECT TITLE: N/A

tools for advanced sensor design.

o. (U) Demonstrate performance model of notional large-scale Navy airborne systems.

p. (U) Demonstrate the design through simulation software for Navy airborne systems.

q. (U) Complete development of operator interface design guidelines to improve the display of multiple-source sensor data.

r. (U) Complete the development of advanced auditory and visual display concepts to improve passive sonar analysis.

s. (U) Began tri-service program in Computer-Aided Microelectronics to promote the rapid insertion of electronic technology into systems.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Naval Civil Engineering Laboratory, Port Hueneme, CA; Naval Air Warfare Center, China Lake, CA and Warminster, PA; Naval Surface Warfare Center, Bethesda, MD and Dahlgren, VA; Naval Undersea Warfare Center, New London, CT; Naval Command Control and Ocean Surveillance Center, San Diego, CA; Naval Research Laboratory, Washington, D.C..
CONTRACTORS: ALCOA, Alcoa Center, PA; MDAC, St. Louis, MO; Hughes Aircraft, Torrance, CA; Raytheon, Waltham, MA; LMSC, Sunnyvale, CA; SPARTA, Inc., LaJolla, CA; TI, Dallas, TX.

E. (U) COMPARISON WITH FY 1992/93 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: None

2. (U) SCHEDULE CHANGES: None

3. (U) COST CHANGES: An increase of \$11.2M in FY 1993 reflects an increase of \$3.2M for Defense Business Operations Fund operating costs and miscellaneous financial adjustments. The remaining increases reflect an additional \$7.0M for the RF Vacuum Electronics Technology Program and \$1.0M for Computer-Aided Microelectronics, both increases under the Defense S&T Thrust for Affordability.

F. (U) PROGRAM DOCUMENTATION: Not Applicable

G. (U) RELATED ACTIVITIES: This program adheres to Tri-Service Reliance Agreements on Advanced Materials, Electronic Devices, and Software with oversight provided by the Joint Directors of Laboratories. Work in this Program Element is related to and fully coordinated with efforts in PE 0601102A, PE 0602105A, PE 0602705A, PE 0602783A, PE 0603120A, PE 0602789A, PE 0603342A, PE 0602111N, PE 0602113N, PE 0602121N, PE 0602122N, PE 0602223N, PE 0602314N, PE 0602323N, PE 0601102F, PE 0602102F, PE 0602204F, PE 0602702F, PE 0603112F, PE 0603203F, PE 0603728F, and PE 0603758F in accordance with the ongoing Reliance joint planning process and contains no unwarranted duplication of effort among the Military Departments.

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable

J. (U) MILESTONE SCHEDULE: Not Applicable

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602270N

BUDGET ACTIVITY: 1

PROGRAM ELEMENT TITLE: ELECTRONIC WARFARE TECHNOLOGY

PROJECT NUMBER: N/A

PROJECT TITLE: N/A

A. (U) RESOURCES: (Dollars in Thousands)

TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
EW Technology	12,936	13,906	18,474	CONT.	CONT.

B. (U) DESCRIPTION: This program addresses the required technologies of Electronic Warfare (EW) in cooperation with the other services, and also addresses Navy unique war-at-sea EW technologies. This element supports the DoD Science and Technology Investment Strategy and the following ten DoD Critical Technologies: Semi-conductor Materials and Microelectronics, Simulation and Modeling, Passive Sensors, Signal and Image Processing, Signature Control, Data Fusion, Machine Intelligence and Robotics, Photonics, Sensitive Radars, and Weapons System Environment. All work in this program is jointly planned by the Army, Navy and Air Force in accordance with Tri-Service Reliance agreements. The development of countermeasures in this diverse and increasingly modern technological world requires an ever higher level of EW technology to succeed. The highly successful weapons deployed by coalition forces during Desert Storm were, in many cases, the result of designs that were more than 10 years old.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Transitioned Straight Through Repeater Antenna Performance (STRAP) decoy to a Tri-service 6.3 Advanced Development program under PMA-253.
- b. (U) Transitioned the Multiband Anti-Ship Missile Defense (ASMD) Tactical EW System (MATES) to a 6.3A Advanced Technology Demonstration (ATD) in FY 1992.
- c. (U) Transitioned the Signature Recognition Countermeasures work to a 6.3A Synthetic Aperture Radar (SAR) Countermeasures ATD commencing in FY 1992.
- d. (U) Completed Shipboard Anti-Radiation Missile (ARM) Counter Measures (CM) Study which recommends combined Radar/EW testing.
- e. (U) Submitted a patent application (Navy Case # 73,443) which involves a new and unique concept for incorporating ship-like modulation characteristics into a Van Atta Array.
- f. (U) Demonstrated Flying Infrared TORCH (FLIRT) concept and established the basis for a transition of this concept to a new start 6.4 program under NAVSEA 06W.
- g. (U) The Activated Metal Decoy (AMD) effort resulted in an Operational Requirement (OR) and units being procured for use in Desert Storm.
- h. (U) Demonstrated Unintentional Modulation on Pulse (UMOP) receiver/processor in overseas test.
- i. (U) Successfully field tested an Acousto-Optic (AO) channelizer/signal processor against a real Low-Probability-of-Intercept (LPI) signature of interest.
- j. (U) Demonstrated Fiber Optic Laser Warning System (FOLWS).

2. (U) FY 1992 PROGRAM:

- a. (U) Integrate false-target/decoy discriminator into fleet radar.
- b. (U) Field test thin ring chaff.
- c. (U) Demonstrating proof of concept involving fusing of simulated radar and Electric Support Measures (ESM) data.
- d. (U) Demonstrate three-dimensional visualization terminal phase missile-on-ship EW engagements.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602270N

BUDGET ACTIVITY: 1

PROGRAM ELEMENT TITLE: ELECTRONIC WARFARE TECHNOLOGY

PROJECT NUMBER: N/A

PROJECT TITLE: N/A

e. (U) Antenna coupling experiments and a noise waveform investigation will be conducted against a suitable Over the Horizon (OTH) type radar.

f. (U) An operational test will be conducted against Synthetic Aperture Radar (SAR) using a millimeter wave (MMW) Direction Finding (DF) receiver antenna array.

g. (U) Evaluation of Phase I Millimeter Wave Monolithic Integrated Circuit (MIMIC)/EW receiver to be completed.

h. (U) Color-balanced flare technology to transfer into the ongoing 6.3/6.4 kinematic flare program.

i. (U) Field test experiments of full-scale Multicloud Infrared (IR) chaff decoy rounds.

3. (U) FY 1993 PLANS:

a. (U) Optimized algorithms to model shipboard EW sensor integration will be developed, demonstrated, and made available for incorporation into the Ship Self-Defense Initiative/Quick Reaction Combat Capability (QRCC) program.

b. (U) Over-the-Horizon Radar (OTHR) countermeasures testing will be conducted, with results leading to a planned submission for an ATD to commence in FY 1995.

c. (U) The Small Ship Compatible Decoy and the Light-Weight MK-36 Compatible Decoy payload development will be completed and available for incorporation as an EW subsystem application for the Ship Self-Defense Initiative/QRCC program.

d. (U) Complete the Advanced Multi-mode Active Electronic Counter Measures (ECM) development.

e. (U) Results of technologies being investigated under surface decoys, DDG-51 digital model and Anti-Shipping Missile (ASM) generic concepts development efforts will be demonstrated, and made available for incorporation into the Ship Self-Defense Initiative/QRCC program.

f. (U) Kinematic AMD flare technology will be demonstrated in full-up round testing, and be available for transition to 6.3/6.4 as a product improvement.

g. (U) Polarization vector characterization technology development will be completed and available for insertion into on-going Radio Frequency (RF) countermeasures ATD efforts.

h. (U) Continue development and evaluation of a shipborne MMW receiver/jammer.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Naval Research Laboratory, Washington, DC; Naval Air Warfare Center, Warminster, PA; Naval Surface Warfare Center, Crane, IN. CONTRACTORS: Locus, State College, PA; Questech Inc., McLean, VA; John Hopkins University/Applied Physics Lab, Silver Spring, MD; Westinghouse Corp., Pittsburgh, PA; Tracor, San Ramon, CA.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not Applicable.

2. (U) SCHEDULE CHANGE: Not Applicable.

3. (U) COST CHANGES: An increase of \$4.1M in FY 1993 reflects an increase of \$1.8M for Defense Business Operations Fund (DBOF) operating costs and miscellaneous financial adjustments. The remaining increase of \$2.3M will

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602270N

BUDGET ACTIVITY: 1

PROGRAM ELEMENT TITLE: ELECTRONIC WARFARE TECHNOLOGY

PROJECT NUMBER: N/A

PROJECT TITLE: N/A

be used to accelerate development of robust countermeasures technologies and techniques against multi-mode/multi-spectral (RF, IR and/or ARM), low-probability-of-intercept, and millimeter-wave missile seeker threats in order to enhance ship's self-defense.

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

G. (U) RELATED ACTIVITIES: This program adheres to Tri-Service Reliance Agreements on Electronic Warfare with oversight and coordination provided by the Joint Directors of Laboratories. Work in this Program Element contains no unwarranted duplication of effort among the Military Departments and is associated with PE 0602204F, PE 0603270F, PE 0602270A, PE 0603270A, and PE 0605604A. This Program Element is also closely associated with PE 0602111N (Anti-Air Warfare/Anti-Surface Warfare Technology), PE 0602315N (Mine and Special Warfare Technology), PE 0602234N (Systems Support Technology), PE 0602232N (Command, Control, and Communications Technology), PE 0603270N (Advanced Electronic Warfare Technology), and PE 0603792N (Advanced Technology Transition (EW related)).

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602314N

BUDGET ACTIVITY: 1

PROGRAM ELEMENT TITLE: UNDERSEA SURVEILLANCE AND WEAPONS TECHNOLOGY

PROJECT NUMBER: N/A

PROJECT TITLE: N/A

A. (U) RESOURCES: (Dollars in Thousands)

	FY 1991	FY 1992	FY 1993	TO	TOTAL
TITLE	ACTUAL	ESTIMATE	ESTIMATE	COMPLETE	PROGRAM
Undersea Surveillance and Weapons Technology	125,807	130,024	146,194	CONT.	CONT.

B. (U) DESCRIPTION: (U) This element develops critical undersea surveillance and weapons technologies to detect, classify, localize, track, and kill or neutralize undersea targets in all environments. Weapon sensor, propulsion, and guidance technologies are also applicable to the development of Unmanned Undersea Vehicles (UUVs). It supports the DOD Science and Technology Strategy for Undersea Superiority, specifically in the areas of shallow-water/regional warfare, submarine and surface ship survivability, and UUVs. It also supports the following DOD Critical Technologies: High Performance Computing, Robotics, Simulation and Modeling, Photonics, Passive Sensors, Signal and Image Processing, Weapon System Environment, Data Fusion, Computational Fluid Dynamics, High-Energy Density Materials, and Superconductivity.

(U) The program has been restructured to emphasize technologies needed to improve undersea sensor and weapon performance in harsh, shallow-water environments typically found adjacent to third-world and emerging regional powers, and to accelerate torpedo defense technologies for both surface ships and submarines. This restructuring was done in response to changes in the geo-political situation, namely, the breakup of the Soviet Union and the rise of regional powers. The proliferation of quiet, modern diesel-electric submarines, world-wide availability of advanced undersea weapon and sensor technologies, and potential for third-world acquisition of submarines based on new, air-independent propulsion exacerbates the problem for US forces when required to operate in shallow, acoustically noisy, coastal waters. Today's fiscal constraints are dictating the drawdown of Fleet assets and increase the importance of unit self-protection. Finally, the Commonwealth of Independent States still possesses large numbers of modern, acoustically quiet attack and ballistic missile submarines which could pose a formidable threat to the US should the political situation undergo a sudden change.

(U) The program element addresses both traditional deep-water and emerging shallow-water threats. Technologies for

including robust acoustic sensors; and full-spectrum processing of passive acoustic signals are being pursued. New emphasis has been placed on

sensors for shallow-water environments. Improved, lower-cost sensors are being sought for systems deployed from air, submarine and surface platforms. For needed weapon performance,

technologies, particularly in shallow water against

contacts, are being developed, as are advanced propulsion systems,

Guidance and Control (G&C) efforts

Quieting programs emphasize

advanced machinery, propellers and

Countermeasures work includes

Combat control efforts include

operator decision aids, data fusion and target contact management.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) SURVEILLANCE:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Conducted

test.

b. (U) Conducted

in the Atlantic.

c. (U) Tested

array at sea.

d. (U) Conducted sea-test of directional, multimode optical

towed-array sensors for left-right ambiguity resolution.

e. (U) Demonstrated

increase in power density for

tactical active transducers using

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602314N

BUDGET ACTIVITY: 1

PROGRAM ELEMENT TITLE: UNDERSEA SURVEILLANCE AND WEAPONS TECHNOLOGY

PROJECT NUMBER: N/A

PROJECT TITLE: N/A

- f. (U) Demonstrated processing using data on a massively parallel computer.
- g. (U) Designed and fabricated a transducer for shallow and deep ocean applications.
- h. (U) Demonstrated greater than increase in detectability of submarine-radiated signals with
- i. (U) Achieved increase in source level for transducers using
- j. (U) Applied to detection of submarine signals.
2. (U) FY 1992 PROGRAM:
 - a. (U) Complete analysis of Array Experiment.
 - b. (U) Conduct sea test of array.
 - c. (U) Conduct test of sensor.
 - d. (U) Conduct in-water test of a for rapidly deployable surveillance systems.
 - e. (U) Demonstrate processing for system.
 - f. (U) Conduct test of data fusion algorithms for integrating existing undersea sensors.
 - g. (U) Demonstrate improved active-classification techniques incorporating and display capabilities.
 - h. (U) Conduct airborne test.
 - i. (U) Complete development of
 - j. (U) Initiate development of for use in processing active sonar signals.
3. (U) FY 1993 PLANS:
 - a. (U) Demonstrate advanced submarine detector,
 - b. (U) Conduct sea-test of dual, arrays.
 - c. (U) Complete development of an advanced sonobuoy.
 - d. (U) Demonstrate enhanced undersea signal detection by fusion of data from sensors.
 - e. (U) Test prototype high-power, projector.
 - f. (U) Transition
 - g. (U) Test an array or projector.
 - h. (U) Conduct a cooperative shallow-water, sea-test with NATO's SACLANT Centre.
 - i. (U) Fabricate and test transducer.
 - j. (U) Transition real-time algorithm.
 - k. (U) Conduct sea-test of a detector and classifier.
4. (U) PROGRAM TO COMPLETION: This is a continuing program.
- (U) TORPEDOES AND WARHEADS:
 1. (U) FY 1991 ACCOMPLISHMENTS:
 - a. (U) Transitioned algorithm to Advanced Technology Demonstration (ATD) Program.
 - b. (U) Demonstrated surface ship combat control simulations using multistatic sonar in open-ocean/regional-warfare scenarios.
 - c. (U) Demonstrated battery cartridge for torpedo propulsion.
 - d. (U) Began system tests of pilot-scale energy system.
 - e. (U) Completed laboratory tests of propulsion components for submarine and surface ship point defense.
 - f. (U) Demonstrated underwater explosive with more
 - g. (U) Completed test and analysis of warhead technology against highly survivable, 1/4-scale model submarine.
 2. (U) FY 1992 PROGRAM:

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FY 1993 RDTEE, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602314N

BUDGET ACTIVITY: 1

PROGRAM ELEMENT TITLE: UNDERSEA SURVEILLANCE AND WEAPONS TECHNOLOGY

PROJECT NUMBER: N/A

PROJECT TITLE: N/A

- a. (U) Demonstrate maneuver decision aid for combat planning.
- b. (U) Complete evaluation of _____ array.
- c. (U) Test 21-inch diameter _____ battery in laboratory.
- d. (U) Test propulsion, warhead, fuze, and guidance technologies for an _____
- e. (U) Conduct in-water runs to test _____ guidance laws for open ocean and shallow water.
- f. (U) Demonstrate lethality of _____ warhead.
- g. (U) Demonstrate underwater explosive with _____ percent more _____
- h. (U) Demonstrate _____ energy source for long-endurance vehicles at _____

3. (U) FY 1993 PLANS:

- a. (U) Integrate _____ propulsion system with large-diameter _____ and conduct in-water demonstrations.
- b. (U) Integrate an advanced electric motor system with a large-diameter _____ vehicle and demonstrate in-water performance.
- c. (U) Demonstrate the _____ on large-diameter _____ vehicle in-water.
- d. (U) Demonstrate an intelligent controller for advanced Guidance and Control (G&C) systems for shallow-water/regional-warfare applications.
- e. (U) Initiate evaluation of next-generation high-lethality warhead.
- f. (U) Conduct laboratory demonstration of _____ battery integrated with an advanced _____ motor system.
- g. (U) Transition _____ warhead concept to Advanced Capability Torpedo.
- h. (U) Convert large-diameter _____ for use as UUV technology demonstration test bed.
- i. (U) Conduct in-water closed-loop demonstration of G&C and fuze concept.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NSWC, White Oak, MD, Bethesda, MD and Panama City, FL; NAWC, Warminster, PA; NCCOSC, San Diego, CA; NUWC, Newport, RI & New London, CT; NUWES, Keyport, WA; NRL, Washington, DC and Stennis Space Ctr, MS. **CONTRACTORS:** General Electric, Syracuse, NY; ARL/PSU, State College, PA; SAIC, McLean, VA; AT&T, Whippany, NJ; Texas Instruments, Dallas, TX.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

- 1. (U) **TECHNOLOGY CHANGES:** Not Applicable.
- 2. (U) **SCHEDULE CHANGES:** Not Applicable.
- 3. (U) **COST CHANGES:** An increase of \$11.9M in FY 1993 associated with Defense Business Operations Fund rate adjustments and an increase in Defense S&T Thrust in Undersea Superiority which will be used to accelerate critical technology demonstrations in shallow-water surveillance/weapon capabilities & torpedo defense.

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

G. (U) RELATED ACTIVITIES: PE 0602435N, Ocean and Atmospheric Support Technology; PE 0101224N, SSBN Security Tech Program; PE 0601153N, Defense Research Sciences; PE 0603741D Air Defense Initiative; PE 0603747N Advanced ASW Technology. This program adheres to Tri-Service Reliance Agreements on Conventional Air/Surface Weaponry with oversight provided by the Joint Directors of Laboratories. Work in this program is fully coordinated with efforts in PE 0602602F, PE 0603601F and PE 0602624A in accordance with the ongoing Reliance joint planning process and contains no unwarranted duplication of effort among the military departments.

H. (U) OTHER APPROPRIATION FUNDS: None.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Selected ASW Surveillance and Weapons technology issues and investigations supported by this Program Element are coordinated with collaborative efforts addressed by the ASW Sonar and Weapons panels of The Technical Cooperation Program (TTCP) with Australia, Canada, New Zealand, and the United Kingdom.

J. (U) MILESTONE SCHEDULE: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602315N

BUDGET ACTIVITY: 1

PROGRAM ELEMENT TITLE: MINE AND SPECIAL WARFARE TECHNOLOGY

PROJECT NUMBER: N/A

PROJECT TITLE: N/A

A. (U) RESOURCES: (Dollars in Thousands)

	FY 1991	FY 1992	FY 1993	TO	TOTAL
TITLE	ACTUAL	ESTIMATE	ESTIMATE	COMPLETE	PROGRAM
Mines and Special Warfare Technology	19,750	20,445	45,536	CONT.	CONT.

B. (U) DESCRIPTION: This program element (PE) provides new technologies for U.S. naval mines, mine countermeasures (MCM), Special Warfare, and Explosive Ordnance Disposal (EOD) equipment. It supports the DOD Science and Technology (S&T) Strategy for Undersea Superiority with particular emphasis upon technologies for shallow-water and surf-zone MCM. The element also supports the DOD Critical Technologies plan for the following areas: Robotics, Passive Sensors, Signal Processing, Weapon System Environment, and Superconductivity.

(U) Mine Technology. New technologies must be developed if future mines are to be effective against sophisticated submarine threats. Modern submarines, represented by the MIKE, SIERRA, AKULA, and TYPHOON, include

Third-world submarines include numerous Kilo, West German "Type 209", and other relatively small, modern diesel/electric submarines exported to developing countries. New technology is needed to facilitate containment of these smaller submarines in the typically shallow bays, gulfs and coastal areas encountered in regional conflicts. Current technology emphasis is on sensors, mine delivery, and improved capabilities. Enhanced performance cannot be achieved by increased size or quantity alone because of delivery constraints.

(U) MCM Technology. The capability of third-world nations to stockpile and effectively deploy large numbers of sea and anti-invasion mines in shallow-water and surf-zone regions has been demonstrated recently.

many of which have performance characteristics.
Third-world nations

Major emphasis is being placed on the detection and neutralization of mines encountered in the shallow-water approaches and the surf-zone regions of the Amphibious Operating Area. Mine clearance technology development includes methods to address the threat of on the surface. Work is also directed toward improving mine influence-sweep capabilities,

(U) Special Warfare Technology. Naval Special Warfare missions are primarily clandestine or covert in character and support naval operations by reconnaissance and clearing of amphibious landing beaches, by underwater attacks against enemy shipping and port installations, by raids against targets in coastal areas, by intelligence collection through reconnaissance and/or capture of personnel, and by counter-terrorism with emphasis on recovery of captured ships and aircraft. The principal Special Warfare goal is to develop technology required to increase the combat range and effectiveness of Special Warfare units

Improvements to mission support equipment, such as updated weaponry, are needed urgently to increase the probability of mission success. A major current focus is on technology for

(U) EOD Technology. Technology development for the EOD needs of all the Armed Forces is addressed, including that required to counter and dispose of

The effort concentrates on developing technologies required for locating, examining and rendering safe conventional and devices in areas where initiation would be catastrophic; in deep water with poor

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1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602315N

BUDGET ACTIVITY: 1

PROGRAM ELEMENT TITLE: MINE AND SPECIAL WARFARE TECHNOLOGY

PROJECT NUMBER: N/A

PROJECT TITLE: N/A

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) MINE WARFARE AND MINE COUNTERMEASURES TECHNOLOGY:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Demonstrated new _____ to allow for the development of _____ less costly mine devices.
- b. (U) Completed fabrication and lab demonstration of _____

c. (U) Developed and empirically validated performance prediction models for sonar search of mines located in very shallow water depths.

d. (U) Collected field data for sidescan sonar-based bottom-sediment classifier performance assessment.

e. (U) Tested effectiveness of explosive net _____

2. (U) FY 1992 PROGRAM:

- a. (U) Demonstrate the use of _____ for target-detection mine techniques.
- b. (U) Fabricate prototype volume search sonar for remotely operated minehunting demonstration.
- c. (U) Demonstrate _____ capability for remote mine search vehicle.
- d. (U) Conduct in-water testing of the mechanical minesweeping tracking/communications systems and sweep wire/mooring line engagements.
- e. (U) Design and fabricate Moored Mine Hardkill attachment device for mechanical mine sweeping.
- f. (U) Develop 3-Dimensional (3-D) hydrocode model for performance predictions of distributed explosive arrays and line charge configurations.
- g. (U) Evaluate the dynamic range and gating _____ mine detector application.

3. (U) FY 1993 PLANS:

- a. (U) Demonstrate, via testing and analysis, the feasibility of _____ as viable mine sensor.
- b. (U) Sea test and demonstrate individual sensors for remotely operated underwater mine neutralizer.
- c. (U) Conduct at-sea demonstration/optimization tests of wide-swath mine search sonar prototype for remote vehicle use.
- d. (U) Demonstrate motion-compensated operation of synthetic-aperture mine-search sonar under vigorous shallow-water conditions.
- e. (U) Fabricate/test alternate optimized efficient _____ mine detector application.
- f. (U) Establish data bases and models for assessing effectiveness of distributed explosive arrays in clearing _____
- g. (U) Investigate additional alternatives for surf-zone area mine clearance systems deployment.
- h. (U) Demonstrate concomitant sweep/destruction concept against tethered mines.
- i. (U) Survey artificial intelligence processing approaches for rapid semi-automated mine detection and identification.
- j. (U) Assess candidate _____ concept options for primary approach selection.
- k. (U) Test effectiveness of _____ configuration for magnetic mine-sweep field source.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

(U) SPECIAL WARFARE/EXPLOSIVE ORDNANCE DISPOSAL

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Conducted lab tests of underwater _____ principle.
- b. (U) Developed prototype acoustic detector for shallow-water buried mines.
- c. (U) Verified predicted performance of covert obstacle avoidance sonar.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602315N

BUDGET ACTIVITY: 1

PROGRAM ELEMENT TITLE: MINE AND SPECIAL WARFARE TECHNOLOGY

PROJECT NUMBER: N/A

PROJECT TITLE: N/A

d. (U) Evaluated viable reconnaissance through smoke/obscurants.
e. (C) Verified performance of _____ design
for _____ technique.

2. (U) FY 1992 PROGRAM:

- a. (U) Develop 3-D water-entry model and perform _____ survivability analysis.
- b. (U) Develop controllable thermal valve for diver suit use.
- c. (u) Evaluate _____ circuit evaluation.
- d. (u) Validate _____ entry technique.

3. (u) FY 1993 PLANS:

- a. (u) Collect water-entry load and acceleration data for a full-scale
- b. (U) Design & fabricate Diver Thermal (variable control) Protection Suit and test integrated package in simulated thermal environment.
- c. (u) Develop _____ weapon concept.
- d. (U) Demonstrate 2-D very-high-resolution acoustic imaging system using micro-mechanical hydrophones.
- e. (U) Develop robotic serpentine manipulator with end effectors for safer EOD examination & identification of explosive devices.
- f. (u) Test and evaluate _____ sensors.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NSWC, Dahlgren, VA, Panama City, FL, and Bethesda, MD; NEODTC, Indian Head, MD; NRL, Washington, DC and Stennis Space Center, MS; NCCOSC, San Diego, CA; NAWC, Warminster, PA. CONTRACTORS: Texas A&M Univ., College Station, TX; IBM Corp., Manassas, VA; Woods Hole Ocean. Inst., Woods Hole, MA; Ball Aerospace, Golden, CO; Lockheed Missile & Space Corp., McLean, VA.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

- 1. (U) TECHNOLOGY CHANGES: Not Applicable.
- 2. (U) SCHEDULE CHANGES: Not Applicable.
- 3. (U) COST CHANGES: An increase of \$24.5M in FY 1993 reflects an increase of \$1.6M for Defense Business Operations Fund operating costs and miscellaneous financial adjustments. The remaining increase of \$22.9M, driven by lessons learned from Desert Storm, for the Defense S&T Thrust in Undersea Superiority. These funds will be used to accelerate critical technology demonstrations and survey potential alternatives, with subsequent "down-selection" as appropriate, of industry and laboratory initiatives in regional/shallow-water and surf-zone mine countermeasures. Particular focus will be placed upon technologies and capabilities to search for and dispose of underwater mines in shallow-water amphibious and transit areas.

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

G. (U) RELATED ACTIVITIES: PE's 0601153N, Defense Research Sciences; 0602314N, Undersea Surveillance & Weapons Technology; 0602435N, Ocean & Atmospheric Support Technology; 0602233N, Mission Support; 0602131N, Marine Corps Landing Force Technology; 0603601N, Mine Development; 0603502N, Surface MCM; 0603260, Airborne MCM; 0603654N, Joint Service EOD; 0604654N, Joint Service EOD; 1160402BB, Special Operations Advanced Technology; 1110011N, Force Enhancements-Active. This program adheres to Tri-Service Reliance Agreements on EOD with oversight and coordination provided by the Joint Directors of Laboratories. Work in this PE contains no unwarranted duplication of effort among the Military Departments.

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Selected Mine Warfare technology issues and investigations supported by this PE are coordinated with collaborative efforts addressed by the Mine Warfare Panel of The Technical Cooperation Program (TTCP) with Australia, Canada, New Zealand, and the United Kingdom. The Navy recently signed a MOU with Italy, France, Netherlands and Spain for a feasibility study of a Mechanical Minesweeping system. The Navy is also seeking authority to negotiate a MOU for a feasibility study of an Influence Minesweeping system with Italy, Netherlands, Canada, Germany, Norway, Spain and Belgium.

J. (U) MILESTONE SCHEDULE: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602323N
PROGRAM ELEMENT TITLE: SUBMARINE TECHNOLOGY
PROJECT NUMBER: N/A

BUDGET ACTIVITY: 1
PROJECT TITLE: N/A

A. (U) RESOURCES: (Dollars in Thousands)

TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Submarine Technology	14,218	17,722	21,476	CONT.	CONT.

B. (U) DESCRIPTION: This program provides new technologies for submarine vehicles which enable improved stealth along with reduced vulnerability to warheads, while holding costs at current or reduced levels. This element supports the DOD Science and Technology Strategy for Undersea Superiority, specifically in the areas of advanced propulsion, hull structures, and machinery, along with advanced signature reduction. This element also supports the following DOD Critical Technologies: Signature Control, Computational Fluid Dynamics, and Composite Materials, Simulation and Modeling, and Passive Sensors.

(U) Technological developments of the program provide at least the same level of performance as the SSN-21 design but at a reduced acquisition and life-cycle cost and will enhance submarine covertness, performance, and survivability in shallow-water warfare. Program products are to improve existing submarines as well as to provide options for new designs. Program thrusts are: affordability--for reduced acquisition and life-cycle cost; covertness--at a minimum maintain the SSN 21 design acoustic and non-acoustic signatures at reduced cost; survivability--for reduced vulnerability to weapon warheads; and operational performance--to increase performance for shallow-water operations.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) COVERTNESS/SURVIVABILITY:

1. (U) FY 1991 ACCOMPLISHMENTS:

- (U) Laboratory demonstration of propulsor quieting concept.
- (U) Fabricated quarter-scale torpedo launcher and transitioned countermeasure launcher to SSN 21 design.
- (U) Developed large-scale acoustic field imaging
- (U) Completed vent fan technology.
- (U) At-sea demonstration of preliminary control system.

2. (U) FY 1992 PROGRAM:

- (U) Water tunnel test of and design hardware for 1/4-scale LSV advanced technology demonstration.
- (U) Test model of propulsor.
- (U) Laboratory test quarter-scale launcher.
- (U) Complete quiet pump technology.
- (U) Propulsor hydrodynamic flow code prediction development.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602323N
PROGRAM ELEMENT TITLE: SUBMARINE TECHNOLOGY
PROJECT NUMBER: N/A

BUDGET ACTIVITY: 1
PROJECT TITLE: N/A

3. (U) FY 1993 PLANS:

- a. (U) Transition propulsor to advanced development program.
- b. (U) Design a full-scale torpedo launcher.
- c. (U) Conduct experiments with fiber-optic hydrophone
- d. (U) Transition to SSN 21.
- e. (U) Develop for mine threats.
- f. (U) Construct 1/4-scale advanced propulsor for Large Scale Vehicle testing.
- g. (U) Demonstrate for machinery raft.
- h. (U) Design a prototype
- i. (U) Develop relationship between
- j. (U) Develop target-strength-reduction concepts.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

(U) HULL, MACHINERY, AND ELECTRICAL:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Formulated and assessed technologies for minimizing cost.
- b. (U) Established and transitioned criteria on manufacturing imperfections effects on pressure-hull strength at depth.
- c. (U) Demonstrated feasibility of composites for weight, cost, and magnetic-signature reduction with a small-scale model non-pressure-hull stern structure.
- d. (U) Measured shock and fatigue resistance of composite hull models.
- e. (U) Developed a technique to measure change in strength of composite material structures due to heating from fire.
- f. (U) Completed thermoelectric air-conditioning concept assessment which resulted in selecting the Malone liquid carbon dioxide cycle for further exploration as a non-chloro-fluoro-carbon system.
- g. (U) Completed exploratory development of for R&D Submarine.

2. (U) FY 1992 PROGRAM:

- a. (U) Formulate integrated advanced machinery architecture.
- b. (U) Develop advanced electrical power-control system.
- c. (U) Laboratory test advanced, non-chloro-fluoro-carbon air-conditioning system.
- d. (U) Initiate and complete feasibility study for high-performance structure.

3. (U) FY 1993 PLANS:

- a. (U) Evaluate advanced pressure hull
- b. (U) Experimentally evaluate large-scale stern structure.
- c. (U) Experimentally demonstrate large-scale composite machinery foundation.
- d. (U) Evaluate shaftless sea-water pump.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602323N

BUDGET ACTIVITY: 1

PROGRAM ELEMENT TITLE: SUBMARINE TECHNOLOGY

PROJECT NUMBER: N/A

PROJECT TITLE: N/A

e. (U) Initiate development of design procedures for composite non-pressure-hull structures.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Naval Surface Warfare Center, Bethesda, MD, White Oak, MD, and Dahlgren, VA; Naval Undersea Warfare Center, Newport, RI and New London, CT; Naval Research Laboratory, Washington, DC; CONTRACTORS: Applied Research Lab, Pennsylvania State University, State College, PA; Purdue University, West Lafayette IN; Applied Research Lab, University of Texas, Austin, TX; University of Washington, Seattle, WA; US Composites, Troy, NY.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not Applicable.
2. (U) SCHEDULE CHANGES: Not Applicable.
3. (U) COST CHANGES: An increase of \$3.2M for FY 1993 reflects an increase of \$2.2M for Defense Business Operations Fund (DBOF) operating costs and miscellaneous financial adjustments. The remaining increase of \$1.0M reflects a transfer of submarine-hull vulnerability efforts from PE 0602314N.

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

G. (U) RELATED ACTIVITIES: PE 0101228N, TRIDENT Program; PE 0602234N, Systems Support Technology; PE 0603355N, Undersea Superiority Technology Demonstration; PE 0603561N, Advanced Submarine System Development; PE 0603569E, Advanced Submarine Technology (DARPA); and PE 0604561N, SSN 21 Developments.

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602324N
PROGRAM ELEMENT TITLE: NUCLEAR PROPULSION
PROJECT NUMBER: N/A

BUDGET ACTIVITY: 1
PROJECT TITLE: N/A

A. (U) RESOURCES: (Dollars in Thousands)

TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Nuclear Propulsion	14,575	11,958	15,876	CONT.	CONT.

B. (U) DESCRIPTION: Nuclear Propulsion Technology provides the foundation of the Naval Nuclear Propulsion Program's highly integrated research and development effort. Key efforts include developing stronger, lighter, more corrosion-resistant materials needed to ensure plant resiliency, reliability and safety. These efforts are necessary to maintain U.S. technological and operational superiority.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Continued reactor plant materials work to gain improved understanding of material properties, which is a base requirement for design and development of advanced plants. Major efforts included:

a. (U) Development and qualification of advanced cladding, structural materials such as and fabrication processes such as

b. (U) Irradiation, corrosion, mechanical-property testing and metallurgical examination of new and existing materials. This included work on Nickel base alloys 600 and X-750 as well as improved pressure vessel steel base material for use in pressurizers and steam generators, and alternate steam plant water chemistries for use in reducing steam generator tube corrosion.

2. (U) FY 1992 PROGRAM: Continue reactor plant materials work to better understand material properties. Major efforts include:

a. (U) Continue development and qualification of advanced cladding alloys, structural materials, and fabrication processes for application to advanced nuclear propulsion plants.

b. (U) Development, testing, and analysis of reactor and structural materials and verification of design concepts in search of untried applications for existing and developmental materials.

c. (U) Continue irradiation, corrosion, mechanical-property testing and metallurgical examination of new and existing materials to verify survivability under the extreme conditions encountered in a reactor plant, and ensure continued plant safety.

3. (U) FY 1993 PLANS: Continue work on reactor plant materials. Major efforts will include:

a. (U) Continue development and qualification of as well as structural materials and fabrication processes, for application to advanced components.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602324N
PROGRAM ELEMENT TITLE: NUCLEAR PROPULSION
PROJECT NUMBER: N/A

BUDGET ACTIVITY: 1
PROJECT TITLE: N/A

b. (U) Continue irradiation, corrosion, mechanical-property testing and metallurgical examination of new and existing materials, such as Nickel-base alloys X-750 and 625 and pressure-vessel steels, through stress-corrosion, corrosion-fatigue, brittle fracture, and fracture-toughness tests. This includes evaluation of the effects of irradiation, corrosion, and metallurgical compositions on their mechanical properties, such as in pressurizers, to ensure continued plant safety and verify applicability and survivability under the extreme conditions encountered in a reactor plant.

c. (U) Continue development, testing, and analysis of reactor and structural materials and verification of design concepts in search of untried applications, such as in a for existing and developmental materials.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: None; CONTRACTORS: Bettis Atomic Power Laboratory and Plant Apparatus Division of Westinghouse Electric Corporation, Pittsburgh, PA; and Knolls Atomic Power Laboratory and Machinery Apparatus Operation of General Electric Corporation, Schenectady, NY.

E. (U) COMPARISON WITH REVISED FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: None.
2. (U) SCHEDULE CHANGE: None.
3. (U) COST CHANGES: None.

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

G. (U) RELATED ACTIVITIES: This project is related to Program Element 0603570N, Advanced Nuclear Power Systems, and Program Element 0205675N, Operational Reactor Development.

H. (U) OTHER APPROPRIATION FUNDS: None.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) MILESTONE SCHEDULE: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602435N

BUDGET ACTIVITY: 1

PROGRAM ELEMENT TITLE: OCEAN & ATMOSPHERIC SUPPORT TECHNOLOGY

PROJECT NUMBER: N/A

PROJECT TITLE: N/A

A. (U) RESOURCES: (Dollars in Thousands)

TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Ocean and Atmospheric Support Technology	32,641	44,610	49,593	CONT.	CONT.

B. (U) DESCRIPTION: As military technology grows more complex and sophisticated, the effect of the variability of the natural environment on system performance becomes increasingly significant. This element applies knowledge of the atmospheric and oceanographic environment in support of the development of new systems by building in the flexibility and depth to cope with environmental variability. This element also develops our ability to exploit the locally prevailing environment in the field through tactical oceanography, defined as the military use of environmental data and computer-based predictions for tactical advantage.

(U) As the world order changes with the demise of the former Soviet Union, emphasis in this element is shifting from open-ocean conditions to the more difficult, more variable coastal and shallow-water environments characteristic of regional conflicts. These adverse environments are largely unknown, and pose new levels of difficulty for our nominally deep-water systems. Successful prosecution of this element will provide prototype sensor and sensing technology that improve the Navy capability to quantitatively measure and predict geophysical parameters world-wide, and also the technology to convert and display raw geophysical data in terms of military significance and usable formats. This will help strengthen platform self-defense and stand-alone capabilities.

(U) This program supports the Naval Warfare Mission Areas of Anti-Submarine Warfare, Mine Warfare, Anti-Surface Ship Warfare, Strike Warfare, Anti-Air Warfare, and Command, Control, and Communications. It supports the DOD Critical Technologies in Weapon System Environment, Passive Sensors, and Signal Processing. It also supports and is an integral part of the DOD Science and Technology Strategy for Undersea Superiority, with emphasis on tactical oceanography for regional conflicts in coastal regions.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Initiated development of a low-power, low-cost sound-speed & temperature vs depth (CTD) ocean-acoustic sensor, and tested the Slocum autonomous ocean environmental sampling system in gliding mode in lake tests.

b. (U) Initiated development of a tactical oceanography environmental information processing system.

c. (U) Extended the ambient noise model RANDI-II to include system electronic noise and hydrodynamic flow effects.

d. (U) Experimentally confirmed a previously unrecognized propagation anomaly important for radar detection (or homing) of sea-skimmer missiles, developed efficient and fast running radio propagation models for propagation assessment in horizontally varying refractive environments, and developed models to calculate maximum intervisibility ranges for infrared detection of sea-skimming missiles.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602435N

BUDGET ACTIVITY: 1

PROGRAM ELEMENT TITLE: OCEAN & ATMOSPHERIC SUPPORT TECHNOLOGY

PROJECT NUMBER: N/A

PROJECT TITLE: N/A

e. (U) Developed a wind-prediction module for use with Tactical Land Attack Missile (TLAM) on-board USS Missouri in Desert Storm.

f. (U) Tested eddy-resolving ocean-basin model and preliminary coupled ocean-atmosphere model on Navy Class VII computer.

g. (U) Developed new cloud-interactive radiation scheme for Navy Operational Regional Atmospheric Prediction System (NORAPS), and incorporated satellite moisture measurements into Navy Operational Global Atmospheric Prediction System (NOGAPS).

h. (U) Demonstrated first deployability/retrievability of a experimental acoustic array

sea test.

i. (U) Began incorporation of into low-frequency active-sonar reverberation prediction models.

j. (U) Conducted first SPINNAKER test jointly with a Canadian Defense Research Establishment, measuring

k. (U) Demonstrated performance advantages for relative to in-water hydrophones of

based on

sea-test data.

and

2. (U) FY 1992 PROGRAM:

a. (U) Expand Tactical Oceanography program to include additional participation from academic oceanography institutions.

b. (U) Fabricate and test prototype CTD ocean-acoustic sensor, and ocean-test Slocum in gliding and ocean-thermal powered modes.

c. (U) Conduct engineering tests of a tactical oceanography environmental information system

d. (U) Extend tactical array heading noise-rise algorithm

so as to improve towed

array detection capabilities.

e. (U) Complete and release an improved version of the Engineer's Refractive Effects Prediction System, establish program for performance assessment of electromagnetic-electrooptic sensors in complex coastal regions, and develop a mesoscale data-assimilation system for electromagnetic-electrooptical propagation predictions in coastal regions that incorporates visible and infrared sensed satellite information.

f. (U) Achieve 1/4-degree eddy resolution in global ocean model, build-in data assimilation for the Gulf Stream region, and initiate ocean modelling of coastal and semi-enclosed seas to provide predictive capabilities.

g. (U) Complete development of ground parametrization and cumulus downdrafts, and incorporate into NOGAPS.

h. (U) Demonstrate

sensors, and test

3. (U) FY 1993 PLANS:

a. (U) Complete development of the low-cost CTD sensor with sea tests, and conduct prototype trials of Slocum ocean climate sensing capability.

b. (U) Complete development of tactical oceanography environmental information system and

c. (U) Develop prediction techniques for shallow-water ambient noise.

d. (U) Release validated millimeter-wave over-water propagation models based on Pacific, North Atlantic and Mediterranean data; develop electromagnetic propagation models over variable terrain with special emphasis on sea-land boundaries; and develop infrared background radiance models for use in electro-optical tactical decision aids.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602435N

BUDGET ACTIVITY: 1

PROGRAM ELEMENT TITLE: OCEAN & ATMOSPHERIC SUPPORT TECHNOLOGY

PROJECT NUMBER: N/A

PROJECT TITLE: N/A

e. (U) Transition Navy Vertical Aerosol Model, and transition ship-response tactical decision aids to Tactical Environmental Support System.

f. (U) Achieve 1/8-degree eddy resolution in global ocean model, integrate ocean thermal interpolation into coupled ocean-atmosphere model, and complete assessment of four forecast models in the Northwest Atlantic.

g. (U) Incorporate cloud microphysics into NORAPS and evaluate precipitation forecasts in coastal regions.

h. (U) Conduct engineering tests of.

i. (U) Continue SPINNAKER testing jointly with Canadian defense research.

j. (U) Measure characteristics.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Naval Research Laboratory, Washington, D.C., Monterey, CA, and Stennis Space Center, MS; NCCOSC, San Diego, CA; NSWC, Bethesda, MD. CONTRACTORS: Woods Hole Oceanographic Institution, Woods Hole, MA; Applied Physics Laboratory, University of Washington, Seattle, WA; National Center for Physical Acoustics, University of Mississippi, Oxford, MS; Institute for Naval Oceanography, NSTL, MS; Marine Physical Laboratory, Scripps Institution of Oceanography, La Jolla, CA; Applied Physics Laboratory, Johns Hopkins University, Baltimore, MD.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not Applicable.

2. (U) SCHEDULE CHANGES: Not Applicable.

3. (U) COST CHANGES: An increase of \$8.8M in FY 1993 reflects an increase of \$2.5M for Defense Business Operations Fund operating costs and miscellaneous financial adjustments. The remaining increase of \$6.3M is to support a focus on environmental acoustics.

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

G. (U) RELATED ACTIVITIES: Program Element 0602314N, Undersea Surveillance and Weapons Technology; Program Element 0601153N, Defense Research Sciences; Program Element 0603785N, ASW Environmental Acoustic Support.

(U) This program adheres to Tri-Service Reliance Agreements on Environmental Sciences with oversight provided by the Joint Directors of Laboratories (JDL). Work in this Program Element is related to and fully coordinated with efforts in PE 0602784A and PE 0602101F in accordance with the ongoing Reliance joint planning process and contains no unwarranted duplication of effort among the Military Departments.

H. (U) OTHER APPROPRIATION FUNDS: None.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Using Nunn Amendment funds in FYs 1991/1992, the U.S. Navy, in coordination with the Republic of Korea, is conducting a Coastal/Harbor Defense project to improve ASW defenses. This element also supports collaborative efforts within the Undersea Warfare Subgroup of The Technical Cooperation Program (TTCP) with Australia, Canada, New Zealand and the United Kingdom. The US is currently negotiating a MOU with Canada for Arctic R&D.

J. (U) MILESTONE SCHEDULE: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602936N

BUDGET ACTIVITY: 1

PROGRAM ELEMENT TITLE: INDEPENDENT EXPLORATORY DEVELOPMENT

PROJECT NUMBER: N/A

PROJECT TITLE: N/A

A. (U) RESOURCES: (Dollars in Thousands)

TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Independent Exploratory Development	17,774	7,000	12,946	CONT.	CONT.

B. (U) DESCRIPTION: This element supports three distinct programs: (1) the Laboratory Independent Exploratory Development Program (IED), (2) the Navy Scientific Assistance Program (NSAP), and (3) the Office of Naval Technology (ONT) Postdoctoral Fellowship Program.

(U) The IED Program allows Technical Directors (TDs) of navy laboratories and warfare centers the opportunity to support innovative, high-payoff exploratory development projects that the TDs judge to be relevant to their respective missions and to the needs of the Navy and Marine Corps. The IED program serves to foster creative ideas and concepts from in-house scientists and engineers, to strengthen in-house scientific and engineering competence and to aid in recruitment and retention of talented scientific and technical personnel. Ongoing and completed efforts are reviewed by the ONT. Project evaluations and program assessments are provided as guidance to the TDs for future planning purposes.

(U) The NSAP offers rapid responses to Fleet requests for technological assistance in resolving specific problems that impact operational readiness of Navy and Marine Corps forces. Scientists and engineers from naval laboratories and warfare centers serve as Science Advisors to Fleet units in the Atlantic, Pacific and Mediterranean Commands.

(U) The ONT Postdoctoral Fellowship Program is designed to increase the involvement of postdoctoral-level scientists and engineers from academia and industry in scientific and technical areas of interest and relevance to the Navy and Marine Corps. Fellows are competitively selected and work at host naval laboratories and warfare centers.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Developed a low cost, compact, efficient and reliable electrical power regulator for advanced missiles, which is easily modifiable and transferable for commercial standardization.

b. (U) Developed new celsian ceramics with improved physical, optical, and mechanical properties for potential use as radome material for next-generation missiles.

c. (U) Demonstrated methods for expediting the familiarization of trainees with features of enhanced weapon systems and increasing the availability of complex simulators for tactical training.

d. (U) Timely solutions to Fleet technical problems were provided by 28 Science Advisors from naval laboratories and warfare centers including the following Operation Desert Storm contributions: determined acoustic target strength of new threat mines; tested a commercial sonar for mine detection and avoidance role; and measured airborne Fleet radar capability to detect drifting mines.

e. (U) Appointed and placed 27 new Fellows at host naval laboratories and warfare centers and reappointed 41 Fellows for their second or third year to pursue scientific research and technological developments in such fields as: electronic devices; target detection and surveillance; weaponry; simulation; biomedicine; training; material science; and computers.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0602936N

BUDGET ACTIVITY: 1

PROGRAM ELEMENT TITLE: INDEPENDENT EXPLORATORY DEVELOPMENT

PROJECT NUMBER: N/A

PROJECT TITLE: N/A

2. (U) FY 1992 PROGRAM:

a. (U) The IED Program is supporting promising high-payoff R&D projects selected by laboratory/center TDs. Each lab/center will publish their FY 1991 accomplishments and status of projects. On-site reviews of preceding fiscal year lab/center IED efforts will be conducted by ONT and a performance evaluation report provided to the TD for future planning purposes.

b. (U) The NSAP will pursue high-priority requirements for state-of-the-art technology solutions to Fleet problems.

c. (U) The ONT Postdoctoral Fellowship program will solicit, select and place approximately 20 new Fellows to conduct two-year research projects at naval laboratories and warfare centers.

3. (U) FY 1993 PLANS:

a. (U) The IED Program will support promising high-payoff R&D projects with new starts. Each lab/center will publish their FY 1992 accomplishments and status of projects. On-site reviews of preceding fiscal year lab/center IED efforts will be conducted by ONT and a performance evaluation report provided to the TD for future planning purposes.

b. (U) The NSAP will pursue high-priority requirements for state-of-the-art technology solutions to Fleet problems.

c. (U) The ONT Postdoctoral Fellowship program will solicit, select and place approximately 30 new Fellows to conduct two-year research projects at naval laboratories and warfare centers.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Naval Surface Warfare Center, Bethesda, MD; Dahlgren, VA; and Panama City, FL; Naval Air Warfare Center, Warminster, PA; and China Lake, CA; Naval Undersea Warfare Center, Newport, RI; Naval Command Control and Ocean Surveillance Center, San Diego, CA; NCEL, Port Heuneme, CA; NPRDC, San Diego, CA; NTSC, Orlando, FL; NRL, Washington, DC; CONTRACTORS: American Society for Engineering Education, Washington, DC.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: Not applicable.

3. (U) COST CHANGES: A decrease of \$4.8M reflects the net of an increase of \$2.2M due to increases in Defense Business Operations Fund operating costs and other miscellaneous financial adjustments, and a decrease of \$7.0M to reflect the extension of FY 1992 Congressional action in FY 1993.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: PE 0601152N, In-House Independent Laboratory Research; PE 0602121N, Surface Ship Technology; PE 0602314N, Undersea Surveillance and Weapons Technology; PE 0602323N, Submarine Technology; PE 0602111N, Anti-Air Warfare/Anti-Surface Warfare Technology; PE 0602315N, Mine and Special Warfare Technology.

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603109N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: INTEGRATED AIRCRAFT AVIONICS

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W1953	INEWS	4,786	24,925	23,546	Cont.	Cont.
W1954	ICNIA	<u>160</u>	<u>0</u>	<u>0</u>	0	12,503
TOTAL		4,946	24,925	23,546	Cont.	Cont.

B. (U) DESCRIPTION: This program element provides Navy unique funding for the tri-Services Integrated Electronic Warfare System (INEWS) and the Integrated Communications, Navigation, Identification Avionics (ICNIA) effort. The Integrated Aircraft Avionics program is responsive to Congressional/OSD direction regarding modular avionics. INEWS/ICNIA removes/reduces risk from aircraft program decisions to incorporate modular avionics by eliminating/reducing the need for avionics development from airframe development programs.

(U) The maturation of Integrated Modular Avionics (IMA) has diminished the distinction between EW avionics and Communications-Navigation-Identification (CNI) avionics. Shared processing, shared memory and shared antenna resources are fundamental characteristics of IMA and these have resulted in the functional and physical blending of EW and CNI in the A3 architecture. This has resulted in the requirement to merge certain previously considered CNI functions into INEWS and certain EW functions into ICNIA. Functions such as Electronic Signal Measurement, Proforma, tactical data links, target tracking, etc. all now fall within both the classical EW and CNI areas of responsibility. As a result, the Integrated Aircraft Avionics line is merging the INEWS and ICNIA development efforts into a coordinated program. Both lab and flight test assets will be gradually configured to accommodate the full range of IMA functions.

(U) The INEWS project is managed by a NAVAIRSYSCOM Detachment at Wright Patterson AFB, OH, in close coordination with the Air Force Advanced Missile Warnings System (AMWS), the Advanced Strategic and Tactical Expendables (ASTE), and Advanced Tactical Fighter (F-22) programs.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603109N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: INTEGRATED AIRCRAFT AVIONICS
PROJECT NUMBER: W1953 PROJECT TITLE: INTEGRATED ELECTRONIC WARFARE
SYSTEMS (INEWS)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W1953	INEWS	4,786	24,925	23,546	Cont.	Cont.

B. (U) DESCRIPTION: INEWS is an advanced development program to develop electronic warfare components, modules and systems which enhance aircraft effectiveness and improve survivability and reduce system life cycle costs. To improve reliability and maintainability and reduce life cycle costs, INEWS developed modules will conform, to the maximum extent possible, to Joint Integrated Avionics Working Group (JIAWG) approved specifications for Advanced Avionics Architecture (A3). INEWS capitalizes on previous investment made during the development of advanced aircraft, such as the A-12 and ATF, but is not contingent upon the further development of these platforms. The INEWS project will develop the technology and produce a limited number of modules/components for Demonstration/Validation (DEM/VAL), demonstrate the performance and technical maturity of these components in both an Integrated Test Facility and DEM/VAL Flight Test Bed, and assist in the programmatic transition of selected subprojects to a different Program Element for Engineering and Manufacturing Development (EMD).

(U) The INEWS project is comprised of several subprojects (Missile Warning System, Laser Warning System, Radar Warning Receiver, Advanced Expendables, etc.) which are at varying stages of design maturity. INEWS is not a "black box" to be installed in aircraft, but, rather, a development effort which will yield a set of modules with specific functional and physical characteristics and interfaces. Selected INEWS developed modules will be integrated into a platform (or system/ subsystem), as required to satisfy the functional requirements, while still maintaining hardware and software commonality with modules selected for use in other applications. INEWS developed modules have application to all new aircraft design efforts and retrofit application to all existing aircraft improvement programs.

(U) Significant cost savings in both the development and system life cycle will be realized by maximizing the use of common (multiple use/application) hardware and software modules.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603109N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: INTEGRATED AIRCRAFT AVIONICS
PROJECT NUMBER: W1953 PROJECT TITLE: INTEGRATED ELECTRONIC WARFARE
SYSTEMS (INEWS)

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:
 - a. (U) Completed F/A-18C/D and F/A-18 E/F INEWS Missile Warning System Installation Feasibility Study.
 - b. (U) Completed preliminary INEWS Flight Test Bed design concept.
 - c. (U) Flight tested DEM/VAL prototype kinematic flare.
 - d. (U) Developed design concept for JIANG upgrade of AN/ALQ-156A Missile Warning System.
 - e. (U) Completed phase/amplitude measurements of prototype low-band antenna.
2. (U) FY 1992 PROGRAMS:
 - a. (U) Commence development of JIANG compliant upgrade of ALQ-156 missile warning system based upon INEWS modules.
 - b. (U) Commence detail design of Navy INEWS/ICNIA Flight Test Bed (FTB).
 - c. (U) Commence detail design of Modular Avionics Test Facility (MATF) at the Naval Avionics Center.
 - d. (U) Commence detail design of Navy INEWS Integration and Test Facility (NITF) and Avionics Technology Demonstration Center (ATDC) at the Naval Air Test Center.
 - e. (U) Commence hardware (racks, pods cables) development of test support equipment for the FTB, MATF and NITF.
 - f. (U) Commence development of Navy unique hardware and software modules with the F-22 Electronic Combat Suite Joint Venture Team (Sanders/GS).
 - g. (U) Continue Advanced Technology Expendables and Dispenser System (ATEDS) development.
 - h. (U) Redesign prototype Navy kinematic flare (MJU-20) for Air Force compatible form factor (jointly with Air Force).
 - i. (U) Develop detailed plan for and commence preliminary Cost and Operational Effectiveness Analysis (COEA) for Navy unique systems.
 - j. (U) Initiate contract effort for shared aperture development.
3. (U) FY 1993 PLANS:
 - a. (U) Continue DEM/VAL of Navy unique modules and systems in AFDC, MATF and NITF.
 - b. (U) Demonstrate module/system inflight performance in INEWS flight test bed.
 - c. (U) Continue development and integration of INEWS derivative systems for Navy/Marine Corps aircraft.
 - d. (U) Support transition of selected modules, components, and systems to RND.
4. (U) PROGRAM TO COMPLETION: This is a continuing program.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603109N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: INTEGRATED AIRCRAFT AVIONICS
PROJECT NUMBER: W1953 PROJECT TITLE: INTEGRATED ELECTRONIC WARFARE
SYSTEMS (INEWS)

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRDEVCEW Warminster PA;
NAVWPNSUPPCEN Crane IN; NAVAIRTESTCEN Patuxent River MD; NAVWPNSCEN China
Lake CA; PACMISTESTCEN Point Mugu CA; NRL Washington DC. CONTRACTORS:
Sanders/GE Joint Venture Team, Nashua NH; TRW/Westinghouse Joint Venture Team,
San Diego CA.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: None.
2. (U) SCHEDULE CHANGES: Air Force Critical Design Review (CDR) for
Modular Radar Warning Receiver delayed 1 year for F-22, which in turn delays
Navy application by one year. Reprioritized efforts and accelerated Advanced
Kinematic Expendable MS-II from FY95 to FY93.
3. (U) COST CHANGES: N/A

F. (U) PROGRAM DOCUMENTATION: OR: #200-05-87

G. (U) RELATED ACTIVITIES: PE 0604239F/644069F Air Force Advanced Tactical
Fighter (F-22). These projects are responsive to Congressional/OSD direction
to develop new avionics systems in compliance with JIANG approved
specifications for modular avionics. Navy INEWS subprojects are coordinated
with Air Force efforts by on-site Navy representation within the Air Force
program management offices.

(U) Program Element (PE) 0604270N, Consolidated Electronic Warfare. INEWS
modules/components which successfully demonstrate adequate technical maturity,
performance and cost advantage to justify transition to Engineering and
Manufacturing Development (EMD) will transition to a new Program Element for
EMD execution. It is anticipated that most subprojects will transition to
this Consolidated 6.4 EW PE for Engineering and Manufacturing Development
(EMD).

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) MILESTONE SCHEDULE:

FY92 INEWS JVT Contract Award	1Q/FY92
Advanced Shared Aperture Contract Award	4Q/FY92
FY93 INEWS JVT Contract Award	1Q/FY93
JIANG ALQ-156 Preliminary Design Review	2Q/FY93
JIANG ALQ-156 Critical Design Review	4Q/FY93
Advanced Kinematic Expendable MS-II	4Q/FY93
Modular Radar Warning Receiver MS-II	4Q/FY94
Modular Electronic Support Measures MS-II	4Q/FY95
Modular ECM MS-II	4Q/FY96
Advanced Electro-Optic Countermeasures MS-II	4Q/FY97

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603207M

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X0513	Air/Ocean Prediction	1,544	1,540	1,557	Cont.	Cont.
X0514	Air/Ocean Shipboard Measurements	1,645	2,124	2,108	Cont.	Cont.
X0948	Precise Time/Time Interval	1,412	1,481	1,583	Cont.	Cont.
X2008	Tactical Ocean Data Assimilation and Prediction	2,786	2,118	2,329	Cont.	Cont.
	TOTAL	7,387	7,263	7,577		

B. (U) DESCRIPTION: This program provides a shipboard environmental support capability to optimize weapon, sensor and platform performance as a function of the changing ocean and atmosphere. Projects within this program element relate synergistically to support the infrastructure needed to provide on-scene commanders with timely environmental data needed to make tactical decisions to avoid, mitigate or exploit environmental effects.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603207N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications

PROJECT NUMBER: X0513

PROJECT TITLE: Air/Ocean Prediction

C. (U) DESCRIPTION: This project develops Large Scale Computer numerical oceanic and atmospheric models, such as the Thermodynamic Ocean Prediction System (TOPS) and the Navy Operational Global Atmospheric Prediction System (NOGAPS). Other models under development focus on sea ice, ocean thermal structure and circulation prediction. These prediction systems provide environmental data analyses and forecasts necessary to support all Navy warfare areas. The prediction systems focus on the characterization of the air/ocean interface, a region critical for Naval operations. In addition, the project develops expert systems/artificial intelligence applications which will utilize the model output data to afford decision makers better understanding of operational limitations induced by the environment. The model output data is also provided to Command and Control systems for mission planning and execution.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Delivered prototype tropical cyclone expert system.
- b. (U) Delivered upgraded NOGAPS version 3.2.
- c. (U) Continued global modeling of atmosphere, ocean and sea ice.

2. (U) FY 1992 PROGRAM:

- a. (U) Continue global modeling of atmosphere, ocean and sea ice.
- b. (U) Deliver electro-optical decision aid for several Navy systems.
- c. (U) Deliver Gulf Stream regional model.

3. (U) FY 1993 PLANS:

- a. (U) Continue global modeling of atmosphere, ocean and sea ice.
- b. (U) Deliver NOGAPS version 4.0.
- c. (U) Deliver North Atlantic ocean model.
- d. (U) Deliver tropical cyclone expert system.
- e. (U) Deliver high resolution sea ice model.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Stennis Space Center, MS; NRL, Wash, DC. CONTRACTORS: Not Applicable.

F. (U) RELATED ACTIVITIES: PE 0603704N, ASW Oceanography - provides satellite data; PE 0305111N, Weather Service - provides data base management.

G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 ROT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603207N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications

PROJECT NUMBER: X0514

PROJECT TITLE: Air/Ocean Shipboard Measurements

C. (U) DESCRIPTION: This project provides for the advanced development of sensors, communication interfaces, and processing and display equipment to measure, ingest, store, distribute and display atmospheric and oceanographic parameters essential to the optimum employment of naval warfare systems. Major emphasis areas include tactical workstations, data compression and connectivity, interface technology and the development of new sensors such as active and passive atmospheric profilers for incorporation into the Shipboard Meteorological and Oceanographic Observing System (SMOOS). With these systems, the on-scene commander will continually and automatically monitor the changing atmospheric and oceanographic environment in real time. This will assist in optimizing the performance of weapons, sensors and platforms.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Continued advanced development of communication interface with Navy Tactical Command System Afloat (NTCS-A).

b. (U) Began advanced development of LIDAR (light detection and ranging) atmospheric profiler.

c. (U) Continued advanced development of data connectivity, interfaces with Command and Control (C2) systems and remote workstations.

2. (U) FY 1992 PROGRAM:

a. (U) Complete advanced development of communications interface with NTCS-A.

b. (U) Complete advanced development of LIDAR atmospheric profiler.

c. (U) Continue advanced development of data connectivity, interfaces with Command and Control (C2) systems and remote workstations.

d. (U) Begin advanced development of data compression techniques.

e. (U) Begin advanced development of high resolution interferometer passive atmospheric profiler.

3. (U) FY 1993 PLANS:

a. (U) Begin advanced development of next generation SMOOS sensors.

b. (U) Continue advanced development of data compression techniques.

c. (U) Complete advanced development of data connectivity with the Afloat Planning System.

d. (U) Complete advanced development of remote workstation.

e. (U) Complete advanced development of high resolution interferometer passive atmospheric profiler.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Stennis Space Center, MS; NOSC, San Diego, CA; NRL, Wash, DC; NAVLEXCEN, Vallejo, CA.

CONTRACTOR: Lockheed, Austin, TX.

F. (U) RELATED ACTIVITIES: PE 0604218N, Air/Ocean Equipment Engineering.

G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1992/1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603207N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications
PROJECT NUMBER: X0948 PROJECT TITLE: Precise Time/Time Interval

C. (U) DESCRIPTION: Upgrade the accuracy of the Naval Observatory's Master Clock System (MCS) for DoD surface, subsurface, air and shore communications, navigation and time dissemination systems. Develop advanced detectors and an optical interferometer to study radio and optical sources used for precise star determination.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) On-line interferometer control programs tested
- b. (U) Interferometer site layout and metrology design completed and start prototype tests Joint custom Charge Couple Device (CCD) development with Caltech and Livermore Labs
- c. (U) First very large thinned CCD(2048 x 2048) in testing.

2. (U) FY 1992 PROGRAM:

- a. (U) Delivery and testing of fast interferometer delay line
- b. (U) Test and accept prototype siderostat telescope
- c. (U) Full metrology system under construction
- d. (U) Start siderostat and delay line construction
- e. (U) CCD multiple array sensor testing complete
- f. (U) Install transit telescope laser controls
- g. (U) Start construction at interferometer site

3. (U) FY 1993 PLANS:

- a. (U) Continue Master Clock upgrade
- b. (U) Design Very Long Baseline Interferometer (VLBI) correlator improvements
- c. (U) Install large field wide-field CCD on transit telescope
- d. (U) Install delay lines and siderostats at interferometer site
- e. (U) Set up laser time transfer test bed

4. (U) PROGRAM TO COMPLETION:

E. (U) WORKED PERFORMED BY: IN-HOUSE: NAVOBSY, Washington, DC; NRL, Washington, DC; CONTRACTORS: Interferometrics Inc., VA; Sach Freeman, MD; Applied Research Corp., MD; Lowell Obs., AZ; MIRA, CA; U. Arizona, AZ; California Institute of Technology (JPL), CA.

F. (U) RELATED ACTIVITIES: Not Applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603207N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Air/Ocean Tactical Applications

PROJECT NUMBER: X2008

PROJECT TITLE: Tactical Ocean Data Assimilation and Prediction

C. (U) This project develops new means of environmental data assimilation, including conventional and satellite remotely sensed data, and includes the development of tactical models to utilize these data. The goal is to provide the Navy with a real-time, stand-alone, shipboard tactical scale atmospheric and oceanographic forecasting capability for the Tactical Environmental Support System - TESS(3). Models for the dispersion of solids, liquids and gases at sea and algorithms to assess electromagnetic and electro-optic system performance will also be developed. Information derived from these models will assist the on-scene commander in the optimum employment of weapons, sensors and platforms. The model output data is also provided to Command and Control systems for mission planning and execution.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Continued development of range dependent electromagnetic performance model.
- b. (U) Delivered Battle Group 3D atmospheric analysis model.
- c. (U) Delivered fine resolution Persian Gulf Model.

2. (U) FY 1992 PROGRAM:

- a. (U) Deliver range dependent electromagnetic performance model version 1.
- b. (U) Deliver ocean model validation module.
- c. (U) Begin development of Mediterranean Sea model.
- d. (U) Deliver prototype Vapor, Liquid and Solid Tracking (VLSTrack) model.

3. (U) FY 1993 PLANS:

- a. (U) Deliver 3D VLSTrack model.
- b. (U) Continue development of Mediterranean Sea model.
- c. (U) Deliver range dependent electromagnetic performance model version 2.
- d. (U) Deliver Greenland-Iceland-Norwegian Sea model.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Stennis Space Center MS; NRL, Wash, D.C.; NOSC, San Diego, CA; NSWC, Dahlgren, VA CONTRACTOR: None

F. (U) RELATED ACTIVITIES: PE 0603704N, ASW Oceanography - provides satellite data; PE 0305111N, Weather Service - provides data base management; PE 0604230N, Warfare Support Systems - TESS(3) will use software.

G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

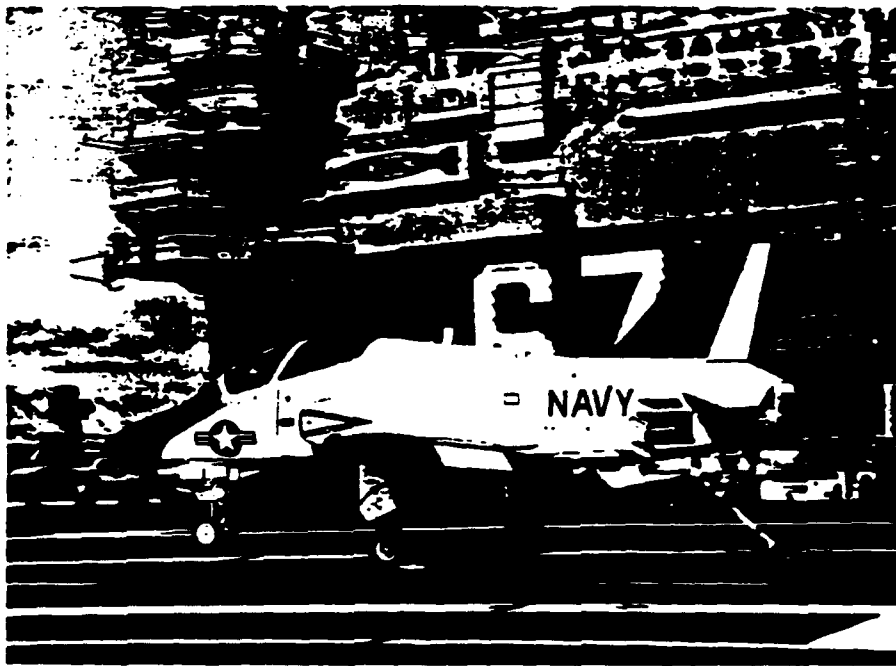
PROGRAM ELEMENT: 0603208N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: T-45 Training System

PROJECT NUMBER: H1142

PROJECT TITLE: T-45 TS



POPULAR NAME: GOSHAWK

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program Milestones		MS IIA 11/91	MS III 6/93 IOC 11/92	
Engineering Milestones			ACFT/SIM BASELINE ESTAB	
T&E Milestones	DT/OT-IIB 11/90	TECHEVAL 8/92	OPEVAL 11/92	
	DT-IIC 6/91			
	OT-IIC 7/91			
Contract Milestones			DEL ACFT #12 FOR IOC	

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603208N BUDGET ACTIVITY: 4
 PROGRAM ELEMENT TITLE: T-45 Training System
 PROJECT NUMBER: H1142 PROJECT TITLE: T-45 TS

BUDGET (\$K)	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
Major Contract	6,500	14,700	29,434	<u>645,117*</u> 30,355
Support Contract	228	168	142	<u>3,799</u> 0
In-House Support	0	0	0	<u>14,289</u> 0
Other	7,975	8,187	2,452	<u>28,595</u> 2,000
TOTAL	14,703	23,055	32,028	<u>661,800</u> 32,355

* Includes previously omitted Pre-FSD (1980-1983) contract.

B. (U) DESCRIPTION: The T45TS mission is to provide undergraduate jet pilot training for prospective carrier-based Navy and Marine Corps pilots, and selected international students, to meet aircrew requirements in the 1990's and beyond. Projected T-2 and TA-4 aircraft shortages due to attrition and service life expiration, as well as increasing operating and support costs, require development of a cost effective replacement. T45TS is a total training system concept which includes aircraft, simulators, academics and contractor logistics support.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:

a. (U) Successfully completed DT/OT IIB demonstrating corrections for DT/OT IIA deficiencies and continued T&E of aircraft and ground training systems.

b. (U) Commenced carrier suitability testing of aircraft.

c. (U) Accepted first two pilot production aircraft.

d. (U) Demonstrated adequate stall characteristics (the first phase of high angle of attack testing).

e. (U) Developed and tested DT/OT IIB corrections.

f. (U) Successfully completed DT/OT IIC.

g. (U) Successfully completed OT-II Phase 3 (Academics).

h. (U) Completed cockpit 21 design study technical report.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603208N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: T-45 Training System

PROJECT NUMBER: H1142

PROJECT TITLE: T-45 TS

2. (U) FY 1992 Program:
 - a. (U) Complete full scale development of aircraft and ground training system including final portion of high angle of attack (HAAQ).
 - b. (U) Complete DT IID (including initial sea trials).
 - c. (U) Conduct TECHEVAL.
 - d. (U) Complete DT-IID (Training Integration System (TIS) Production).
 - e. (U) Conduct OT-II Phase 2 (TIS).
 - f. (U) Design and initial development of digital cockpit including system and preliminary design reviews, configuration mockup and assembly layouts.
 - g. (U) Commence OPEVAL.
 3. (U) FY 1993 Plans:
 - a. (U) Complete OPEVAL.
 - b. (U) Envelope expansion flight testing to extend clearances for ordnance and baggage containers.
 - c. (U) Complete digital cockpit design efforts and continue development including critical design review, integration bench tests and commence fabrication of prototype for aircraft and ground training systems.
 4. (U) Program to Completion: Complete digital cockpit prototype fabrication. Conduct ground tests, government and contractor flight tests and evaluation. FY 94 is last year of RDT&E funding.
- D. (U) WORK PERFORMED BY: IN-HOUSE: NATC, Patuxent River, MD; NTC, Orlando, FL; NAPC, Trenton, NJ; NAEC, Lakeland, FL; NAC, Indianapolis, IN; NADC, Warminster, PA. CONTRACTORS: McDonnell Douglas Corporation McDonnell Aircraft Company St. Louis, MO.
- E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:
1. (U) Technology Changes: Not applicable.
 2. (U) Schedule Changes: OPEVAL changes from 10/92 to 11/92, MS III changed from 2/93 to 6/93. These changes are included in the latest Acquisition Baseline Document currently in OSD for signature.
 3. (U) Cost Changes: The funding increase of \$30.1M in FY 1993 reflects the transfer of the T-45 digital cockpit improvement from the APN account into the RDTE,M account.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603208N BUDGET ACTIVITY: 4
 PROGRAM ELEMENT TITLE: T-45 Training System
 PROJECT NUMBER: H1142 PROJECT TITLE: T-45 TS

F. (U) PROGRAM DOCUMENTATION:

Mission Element Need Statement	6/79
Acquisition Plan	9/90
Navy Training Plan	6/91
TEMP	1/91
DCP	5/91
ILSP	6/91

G. (U) RELATED ACTIVITIES: P.E. 0603216N, Aircrew Systems Technology, P.E. 0604203N, Standard Avionics Development; P.E. 0604264N, Aircrew Systems Development.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
QTY	(0)	(12)	(36)	(208)	(268)
APN-3 (Line 18&19)	157,775	325,896	303,470	3,526,095	5,217,364
MILCOM	0	0	11,800	1,500	34,300

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: This information is contained in the FY 1993 Congressional Data Sheets.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603216N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Aircrew Systems Technology

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	COMPLETE
M0097	Aircrew Impact Injury Prevention	2,979	2,618	2,419	CONT.
W0584	Aircrew Systems Technology	10,281	12,652	7,278	CONT.
	TOTAL	13,260	15,270	9,697	CONT.

B. (U) DESCRIPTION: This program consists of two complementary projects; Project M0097, Aircrew Impact Injury Prevention and Project W0584, Aircrew Systems Technology. Project M0097 develops human dynamic and injury response models (IRM) to impact acceleration and determines the correlation of these dynamic responses with the physiological effects and injuries. Project W0584 uses these models to develop and functionally integrate systems and equipment to ensure aircrew protection against natural and induced environmental or physiological hazards encountered during routine, combat and emergency flight operations as well as during escape, survival and rescue, following loss of the aircraft. The maritime environment makes this project Navy unique. Life support system projects are reviewed by the Tri-Service Life Support Equipment RDT&E Steering Committee, the Joint Environmental Working Group (Flight), the Tri-service Aerospace Medical Research Panel and Technical Working Groups in biodynamics and vibrations/acoustics, to eliminate duplication and ensure commonality. Aircrew Systems Technology is a tri-service coordinated advanced development program.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0603216N

Budget Activity: 4

Program Element Title: AIRCREW SYSTEMS TECHNOLOGY

Project Number: W0584

Project Title: AIRCREW SYSTEMS TECHNOLOGY

C. (U) DESCRIPTION: Develops technology for functionally integrated Navy unique aircrew and life support systems designed to ensure crew protection and enhance crew performance. Resources have been applied to initiate an F/A-18 compatible Navy Combat Edge (CE) System to enhance combat capability of current aircraft and to transition Combat Edge through Milestone II.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Commenced flight test of Navy Combat Edge and Helmet Mounted Sight (HMS).
- b. (U) Manufactured Laser Visor Eye Protection (LVEP) prototypes.
- c. (U) Continued evaluation of Aircrew Integrated Life Support System (AILSS) design concepts.
- d. (U) Continued 21st Century Head Protection (21st CHP), Crash-worthiness (CW), and Advanced Oxygen Delivery System (AODS) design efforts.
- e. (U) Initiated Medium Energy Laser Eye Protection (MELEP) and Advanced Technology Crew Station (ATCS) preliminary designs.

2. (U) FY 1992 PROGRAM:

- a. (U) Evaluate Combat Edge potential for transition to MSII.
- b. (U) Evaluate LVEP, 21st CHP, CW, and AODS prototypes for transition potential to MSII.
- c. (U) Initiate AILSS preliminary design against Navy requirements.
- d. (U) Continue MELEP and ATCS design efforts.
- e. (U) Initiate phase I low cost BioFidelic Manikin (BFM) design.

3. (U) FY 1993 PLANS:

- a. (U) Complete LVEP advanced development.
- b. (U) Complete AILSS, MELEP, and ATCS preliminary designs.
- c. (U) Document 21st CHP, CW and AODS designs.
- d. (U) Provide BFM prototypes for testing under project M0097.
- e. (U) Initiate Patrol and Transport Aircraft and Escape and Survival System (VP/VC ESS) Program.

4. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NADC, Warminster, PA; NWC, China Lake, CA; and NATC, Patuxent River, MD; Naval Surface Warfare Center, Indian Head, MD; CONTRACTORS: Boeing Advanced Systems Division, Seattle, WA; McDonnell Douglas, St. Louis, MO; Gentex Inc., Carbondale, PA; OTHERS: USAF Wright Aeronautical Laboratories, Dayton, OH.

F. (U) RELATED ACTIVITIES: P. E. 0602201F: Aerospace Flight Dynamics; P.E. 0602233N: Mission Support Technology; P.E. 0604264N: Aircrew Systems Development; and P.E. 0604706F: Aircrew Systems Development.

G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0603216N Budget Activity: 4
Program Element Title: AIRCREW SYSTEMS TECHNOLOGY
Project Number: M0097 Project Title: AIRCREW IMPACT INJURY PREVENTION

C. (U) PROJECT DESCRIPTION: This Project develops human dynamic and injury response models of impact acceleration and determines the correlation of these dynamic responses with physiological effects and injuries. These models will be used by all services to evaluate human protective systems designed to prevent impact type injuries.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:
 - a. (U) Collected human response data for vertical +Gz impact with symmetrical head-mounted devices.
 - b. (U) Completed kinematic model for on-axis -Gx and +Gy human impact response.
 - c. (U) Prepared human response data for +Gx, -Gx, +Gy, -Gy and +Gz.
2. (U) FY 1992 Program:
 - a. (U) Analyze human response data for vertical +Gz impact with symmetrical head-mounted devices.
 - b. (U) Complete development of new state-of-the-art kinematic data acquisition system.
 - c. (U) Collect human response data for vertical +Gz impact with asymmetrical head-mounted devices.
 - d. (U) Complete kinematic model for multi-axis human and manikin impact response.
3. (U) FY 1993 Plans:
 - a. (U) Collect human response data for off-axis +Gz, -Gx impact without head-mounted devices.
 - b. (U) Publish preliminary on-axis +Gz, -Gx impact response guidelines for head-mounted devices.
 - c. (U) Publish updated safe/unsafe acceleration guide.
 - d. (U) Test/evaluate Phase I Biofidelic Mannequin (BFM).
4. (U) Program to completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: Naval Biodynamics Laboratory, New Orleans, LA; Naval Air Development Center, Warminster, PA; CONTRACTORS: Crescent Ltd., New Orleans LA; University of New Orleans and Tulane University, New Orleans, LA; GSA Technical Services, Ft. Worth, TX. OTHERS: USAF Armstrong Aeromedical Research Laboratory, Dayton, OH; USA Aeromedical Research Laboratory, Ft. Rucker, AL; Department of Transportation, Wash. DC.

F. (U) RELATED ACTIVITIES: P. E. 0602201F: Aerospace Flight Dynamics; P.E. 0602233N: Mission Support Technology; P.E. 0604264N: Aircrew Systems Development; and P.E. 0604706F: Aircrew Systems Development.

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603217N

BUDGET ACTIVITY: 2

PROGRAM ELEMENT TITLE: Air Systems Advanced Technology Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1991 ACTUAL	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0446	AAS&T	5,819	2,984	6,849	Cont.	Cont.
W0447*	ERASE	5,641	2,984	5,781	Cont.	Cont.
W2014*	IHPTET	7,075	2,968	7,449	Cont.	Cont.
	TOTAL	18,535	8,936	20,079	Cont.	Cont.

* Projects previously funded under PE 0603210N and PE 0603303N.

B. (U) DESCRIPTION: This program element develops and demonstrates advanced concepts for Naval Aviation. Consistent with Congressional language, three air systems program elements have been consolidated into one. Tasks are not confined to a single platform, and address needs beyond current acquisitions. Work is coordinated with other services, DARPA, and NASA, and focuses on Navy unique aviation requirements. There are three ongoing projects:

1. (U) Advanced Avionics Subsystems and Technology (AAS&T): A multi-faceted program maturing advanced Integrated Modular Avionics (IMA) concepts derived from the Joint Integrated Avionics Working Group (JIAWG). Focuses on the common Advanced Avionics Architecture (AAA) directed by Congress for all "advanced aircraft". Program thrust is Navy peculiar applications of advanced IMA for current and future Naval aircraft. Tasks are in five categories:

a. (U) Situation Assessment & Awareness: Demonstrates low-cost alternative information display technologies for manned weapon systems and Unmanned Aerial Vehicles (UAVs) to improve mission planning, performance, and post-mission analysis.

b. (U) Shared Aperture Antenna Systems: Demonstrates prototype integrated shared-aperture antenna systems, to permit sharing of a minimum acceptable set of antennas among several radiating/receiving avionic functions.

c. (U) Digital Technologies: Adapts modular Very High Speed Integrated Circuit (VHSIC) signal processors that are developed under other programs for advanced Navy processing applications. Develops advanced algorithms for sensor processing.

d. (U) Avionic Photonics: Demonstrates optical backplane techniques necessary for Year 2000 data-driven avionics, key components for high speed optical distribution networks, and MIL-STD-1773 optical data bus technology.

e. (U) Avionics Packaging: Demonstrates immersion cooling techniques to cope with ultra-high power densities, lightweight equipment enclosures to reduce weight, a tool-less module clamp to simplify maintenance, and a clamshell module configuration to meet Navy needs in environmental protection.

2. (U) Electromagnetic Radiation Source Elimination (ERASE): ERASE is Navy's principal source of defense suppression technology for aircraft survivability in the presence of lethal radar-directed threat systems and related threat emitters. The program has provided the technology for every US anti-radiation guided missile system including Standard ARM, HARM, SIDEARM and others. ERASE has been used to demonstrate fundamental microwave components, radomes and special receivers and full systems such as HARM and SIDEARM.

3. (U) Integrated High Performance Turbine Engine Technology (IHPTET): This project provides full scale engine testing to demonstrate the practical feasibility and readiness for entering engineering development of emerging, high risk IHPTET technologies. IHPTET is a tri-service program in which each service contributes agreed-to 6.2 and 6.3 funding and laboratory resources to meet substantially improved performance goals. Specific goals are to double thrust-to-weight and halve fuel consumption by year 2003, while maintaining engine durability at current levels. IHPTET is fully coordinated with NASA, DARPA, Army and U.S. Air Force, who also contribute.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603217N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Air Systems Advanced Technology Development
PROJECT NUMBER: W0446 PROJECT TITLE: Advanced Avionics Subsystems & Technology

C. (U) DESCRIPTION: Develops and demonstrates advanced Integrated Modular Avionics (IMA) concepts for application to Navy aircraft. Work is focused on unique Navy concerns, such as demanding physical environment, intense electromagnetic environment, constrained sea-based support environment, and unique Navy mission profiles.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Developed massively parallel architecture for perspective scene generation using low-cost off-the-shelf parallel processors.
- b. (U) Performed successful test and demo of Airborne Shared Aperture System (ASAP) key components. Initiated Joint Navy/Air Force Special Airborne Antenna System (SAAS) concept definition phase.
- c. (U) Began developing design methods for dynamic fault tolerance in integrated modular avionic systems.
- d. (U) Demonstrated very high speed optical components for fiber optic data transmission at 1.25 Gb/sec.
- e. (U) Transitioned advanced packaging concepts for platform use.

2. (U) FY 1992 PROGRAM:

- a. (U) Demonstrate enhanced realism photo-texture perspective scene.
- b. (U) Complete SAAS Preliminary and Critical Design Review (PDR & CDR), initiate prototype fabrication. Initiate prototype ASAP demonstration.
- c. (U) Continue work on application methods for dynamic fault tolerance in avionics.
- d. (U) Demo very high speed optical data switching network to connect advanced sensors and processors.
- e. (U) Develop immersion cooling techniques for high power density avionics.

3. (U) FY 1993 PLANS:

- a. (U) Transition perspective scene generation and plan view capabilities.
- b. (U) Continue SAAS and ASAP prototype development contracts. Investigate signal processing impacts.
- c. (U) Demo avionics fault occurrence simulation/testing techniques.
- d. (U) Demonstrate and flight test high speed sensor data distribution network.
- e. (U) Demonstrate avionics immersion cooling and heat conducting composites.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NADC, Warminster, PA; NAC, Indianapolis, IN; NRL, Washington, DC; WRDC Dayton, OH; DESA, Albuquerque, NM. CONTRACTORS: Cambridge Research Associates, Vienna VA; TRW, San Diego, CA; IBM FSD, Manassas VA; Texas Instruments, Dallas TX; Westinghouse, Baltimore MD; Unisys, Minneapolis MN; Purdue Univ, West Lafayette IN.

F. (U) RELATED ACTIVITIES: Program adheres to Tri-Service Reliance agreements on Integrated Avionics with oversight provided by the Joint Directors of Laboratories. Work in this PE is related to and fully coordinated with efforts in PE 0604203N, Standard Avionics Development; PE 0603109N, Integrated Avionics Systems; PE 0602204F, Aerospace Avionics; and PE 0603224F, Pave Pace.

G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603217N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Air Systems Advanced Technology Development
PROJECT NUMBER: W0447 PROJECT TITLE: Electromagnetic Radiation Source
Elimination (ERASE)

C. (U) DESCRIPTION: The ERASE program is currently focusing on requirements for both emitter location technology and defense suppression missile technologies as documented in the Navy's Strike Warfare Master Plan and Conventional Munitions Plan. Approach is to demonstrate advanced missile seeker technologies as well as emitter location or targeting technologies to ultimately increase aircraft survivability and improve success probability in a power projection mission.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Awarded Passive radio frequency (RF) (2-18 GHz) Targeting system contract to LORAL; F/A-18 pylons refurbished and certified for flight; chamber testing performed on LORAL system and bench tests performed on in-house system.

b. (U) Began fabrication of Advanced Anti-radiation Guidance Demonstration hardware; seeker interface design complete; sensor/processor interface complete.

c. (U) Completed Targeting System low-freq. extension (0.05-2 GHz) design effort.

2. (U) FY 1992 PROGRAM:

a. (U) Complete development of Passive RF Targeting System hardware; continue Targeting System low-frequency extension effort.

b. (U) Begin F/A-18 in-flight technology demo of Passive RF Targeting System.

3. (U) FY 1993 PLANS:

a. (U) Complete Passive RF Targeting System in-flight tech demo; complete data package; transition system to full scale engineering development (PS&D).

b. (U) Complete Targeting System (low-freq) integration.

c. (U) Begin lab tests of Targeting System (low-freq).

d. (U) Complete design/fab for Advanced Anti-radiation Guidance Demonstration.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NWC, China Lake, CA; NOSC, San Diego, CA. CONTRACTORS: LORAL, Newport Beach, CA; Texas Instruments, Colorado Springs, CO; FALON, Inc. & Questech, San Diego, CA.

F. (U) RELATED ACTIVITIES: This program adheres to Tri-Service Reliance Agreements on Electronic Warfare and Conventional Weaponry with oversight provided by the Joint Directors of Laboratories. Work in this Program Element (PE) is related to and fully coordinated with efforts in PE 0207133F, F-16 Squadrons; PE 0203730A, Dual-Mode Chaparral; and EP-3 aircraft program (other agency funds) in accordance with the ongoing Reliance joint planning process and contains no duplication of effort among the Military Departments. This work is fully coordinated with the Working Group to define Tri-service programs in Counter-ARM technologies per direction of JDL and the Office of the Secretary of Defense for DDR&E.

G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603217N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Air Systems Advanced Technology Development
PROJECT NUMBER: W2014 PROJECT TITLE: Integrated High Performance Turbine
Engine Technology (IHPTET) Demonstrator Engine

C. (U) DESCRIPTION: This program element covers the Navy share of the demonstrator engine portion of IHPTET, ensuring that unique Navy design and operational requirements are met. Full scale engine demonstrators are essential to transition technologies from exploratory development into engineering development. Without demonstrators, engineering and manufacturing development (E&MD) would enter at unacceptably higher risk and increased cost or programs would settle for lower technology, lower risk designs. E&MD schedules could increase by as much as 4-5 years. The program funds three demonstrator engine classes: (1) fighter/attack (Joint Technology Demonstrator Engine [JTDE]), (2) turboprop/shaft (Joint Turbine Advance Gas Generator [JTAGG]) and (3) missile/expendable engines (Joint Expendable Turbine Concepts [JETEC]).

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Completed Pratt & Whitney (PW) Phase I JTDE Test - 25% Thrust-to-Weight improvement. Completed Lycoming (LYC) Phase I JTAGG Test - 15% fuel burn decrease.

b. (U) Awarded Teledyne (TCAE), Garrett (GED) and Williams (WI) JETEC Contracts.

2. (U) FY 1992 PROGRAM:

a. (U) Perform General Electric (GE) and PW Phase I JTDE Tests - 20% Thrust-Weight increase, 17%-23% fuel burn decrease. Perform GE/GED and LYC Phase I JTAGG Test - 20% fuel burn decrease.

b. (U) Initiate PW JTDE Phase II contract with smaller Navy unique core size.

3. (U) FY 1993 PLANS:

a. (U) Fabricate PW & GE Phase II JTDE.

b. (U) Continue GE/GED & LYC Phase I JTAGG Test - 25% fuel burn decrease, 60% power-to-weight increase.

c. (U) Initiate turboshaft Phase II contract with larger Navy unique core size.

d. (U) Fabricate and assemble GED, TCAE and WI Phase II JETEC.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAPC, Trenton, NJ; NADC, Warminster, PA. CONTRACTORS: GE, Evendale, OH and Lynn, MA; P&W Aircraft, West Palm Beach, FL; Lycoming, Stratford, CT; Garrett, Phoenix, AZ; Williams Intl., Walled Lake, MI; Teledyne CAE, Toledo, OH; Allison GTE, Indianapolis, IN.

F. (U) RELATED ACTIVITIES: This program adheres to Tri-Service Reliance Agreement on Aeropropulsion, and is covered by joint service MOU's with Army and Air Force. Work in this Program Element is related to and fully coordinated with work in the following Program Elements: Navy: P.E. 0602122N, Aircraft Technology; P.E. 0602234N, System Support Technology. Air Force: P.E. 0603216F, Advanced Turbine Engine Gas Generator; P.E. 0603202F, Aircraft Propulsion Subsystem Integration. Army: P.E. 0603003A, Aviation Advanced Technology.

G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603228N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: CV-ASW MODULE

PROJECT NUMBER: S0517

PROJECT TITLE: CV-ASW MODULE

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0517	CV-ASW MODULE	3,580	3,940	3,621	CONT.	CONT.

B. (U) DESCRIPTION: This continuing program develops computer program and equipment improvements required to upgrade the Aircraft Carrier Antisubmarine Warfare Module (CV-ASWM). An integral part of the carrier Advanced Combat Direction System (ACDS), CV-ASWM provides mission support for embarked S-3 aircraft and CV Helicopters, ASW sensor data processing/analysis, and primary command, control and communications connectivity between air ASW weapon systems, ACDS, the ASW Commander and other battle force ASW components. Critical program needs are ongoing tactical interoperability with evolving combat direction systems and the continued capability to support both new and upgraded ASW aircraft software programs. The baseline is designated Model 4.2. Under Model 4.3, all Model 4.2 capabilities are retained and the following functions added: ACDS Block 1 interoperability, Joint Message Text Format (JMTF) Processing, and Tactical Environment Support System (TESS) interface with tactical decision aids. Model 4.3 development will extend over the period FY 91-93.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Initiated Model 4.3 system development to support ACDS Block 1, Tactical Environmental Support System (TESS), and Joint Message Text Format (JMTF).

2. (U) FY 1992 PROGRAM:

a. (U) Conduct Model 4.2H TECHEVAL and OPEVAL in first quarter.

b. (U) Continue development of Model 4.3 program.

3. (U) FY 1993 PLANS:

a. (U) Conduct critical design review for Model 4.3 hardware and software.

b. (U) Conduct combat systems integration test of Model 4.3.

c. (U) Conduct Model 4.3 Techeval.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Naval Air Warfare Center Division, Warminster, PA; Naval Undersea Warfare Center Division, Keyport, WA.

CONTRACTORS: Intermetrics, Inc, Warminster, PA; Pacer Systems Inc, Horsham, PA

E. (U) RELATED ACTIVITIES: PE 0604518N CIC Conversion. The CV-ASW Module interfaces and exchanges tactical data with this ACDS program.

F. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROG.
(U) OPN#66	4,020	9,882	5,990	CONT.	CONT.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603238N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Global Surveillance, Precision Strike, Air
Defense Technology Demonstrations
PROJECT NUMBER: R2145 PROJECT TITLE: Global Surveillance, Precision Strike,
and Air Defense Technology Demos

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R2145 Global Surveillance/Precision Strike/ Air Defense Tech Demos	0	0	50,000	Cont.	Cont.

B. (U) DESCRIPTION: This Program Element is an FY 1993 new start that is fully coordinated with and supportive of the DOD initiative to focus significant science and technology resources in seven thrust areas. This PE supports Navy participation in joint technology demonstrations in Global Surveillance and Communications, and in Precision Strike. It also funds Navy unique technology demonstrations in Air Defense. These technology demonstrations are designed to validate the technical maturity and potential operational effectiveness of advanced technology concepts before committing to a full acquisition program. Subsequent system development risk associated with cost, schedule, and performance should be reduced commensurately.

(U) The Global Surveillance task is a Joint Service/Defense Agency effort to develop and demonstrate the capability to provide the tactical user with theater of operations, near real time precision targeting information, sensor to shooter target updating, and Battle Damage Assessment (BDA) suitable for integration into proposed Precision Strike systems over extended ranges, through the combined integration of key technologies to satisfy critical tactical requirements. Targeting information and BDA will be generated from multiple existing high-altitude resources and will exploit the capabilities of evolving advanced joint communications systems. System concepts will be developed and simulated to integrate space, air, and ground assets. This task includes funding for Navy participation in Joint programs in Advanced Satellites and Integrated C3.

(U) The Joint Precision Strike task integrates the surveillance and targeting capabilities developed under the Global Surveillance task with high speed processing and precision weapons for rapid response against high-value, short dwell targets over extended ranges. The integrated demonstration addresses the capability to move targeting and BDA information to Navy platforms in near real time using a Copernicus architecture, quickly process and relay information to weapon systems, and attack before the target moves. This task includes funding for Navy participation in a Joint program in Low Cost Adverse Weather Precision Guided Munitions.

(U) The Air Defense task integrates innovative sensor technology and advanced weapons technology in both ship and airborne platforms for detection and engagement of airborne threats. The task will focus on integration and demonstration of weapons and sensor technologies being developed under other programs.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603238N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Global Surveillance, Precision Strike, Air
Defense Technology Demonstrations
PROJECT NUMBER: R2145 PROJECT TITLE: Global Surveillance, Precision Strike,
and Air Defense Technology Demos

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Not applicable.
2. (U) FY 1992 PROGRAM: Not applicable.
3. (U) FY 1993 PLANS:
 - GLOBAL SURVEILLANCE TASK:
 - a. (U) Perform Signal Parameter Exploitation Demonstration.
 - b. (U) Prepare for Precision Targeting Prototype Demonstration.
 - c. (U) Initiate development of prototype Imagery Sensor.
 - d. (U) Participate in Joint advanced satellite and C3 demonstrations.
 - PRECISION STRIKE TASK:
 - e. (U) Initiate development of technology for real time mission planning.
 - f. (U) Initiate preparations for tests against fixed high value targets. Begin planning for more advanced tests against mobile targets.
 - g. (U) Participate in Joint low cost adverse weather precision guided munitions demonstration.
 - AIR DEFENSE TASK:
 - h. (U) Initiate advanced sensor/advanced weapon system integration effort.
 - i. (U) Exploit technologies from other DOD programs in advanced guided weapons, investigating gun, rocket, and missile options, launched from air and surface platforms.
 - j. (U) Initiate preparations for at-sea demonstration.
4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, D.C.; NSWC, Dahlgren, VA; NAWC, China Lake, CA; NAVORDSTA, Louisville, KY; Army and Air Force laboratories to be determined. CONTRACTORS: System primes to be determined.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.
2. (U) SCHEDULE CHANGES: Not applicable.
3. (U) COST CHANGES: +\$OM to initiate new program.

F. (U) PROGRAM DOCUMENTATION: NAPPD being developed.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603238N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Global Surveillance, Precision Strike, Air
Defense Technology Demonstrations
PROJECT NUMBER: R2145 PROJECT TITLE: Global Surveillance, Precision Strike,
and Air Defense Technology Demos

G. (U) RELATED ACTIVITIES: This is the Navy portion of a Joint Service-Defense Agency effort including participation by Army, Air Force, DARPA, and Defense Support Program Office (DSPO). This program adheres to Tri-Service Reliance Agreements on radar, C3, and conventional air/surface weaponry, with oversight provided by the Joint Directors of Laboratories and Director of Defense Research and Engineering. The Global Surveillance task is related to and fully coordinated with work in the following program elements: PE 0603226E, PE 0603006A, PE 0603401F, and PE 0603726F. The Precision Strike task is related to and fully coordinated with work in the following program elements: PE 0603012A, PE 0603772A, PE 0603238A, PE 0603203F, PE 0603238F, PE 0603245F, and PE 0603601F. The Air Defense task is related to and coordinated with efforts in PE 0603270N, Electronic Warfare Technology; and PE 0603795N, Gun Weapons Systems Technology.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Global surveillance milestone schedule available at a higher level of classification. Precision Strike and Air Defense milestone schedules are being developed.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603254N BUDGET ACTIVITY: 4-Tactical Programs
PROGRAM ELEMENT TITLE: Air ASW
PROJECT NUMBER: H1292 PROJECT TITLE: Advanced ASW Sensors & Processors

A. (U) RESOURCES		(Dollars in thousands)				
PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
H1292	Advanced ASW Sensors & Processors	11,108	8,284	10,785	CONT.	CONT.

B. (U) DESCRIPTION: This program provides improved air ASW warfare platform effectiveness through development of advanced hardware and software associated with airborne acoustic systems. This includes sensors, processing, post-processing, data recording and display capabilities to address regional threat scenarios against conventionally powered submarines, represented by the German Type 209, and CIS KILOs and CIS developed quiet nuclear submarines. Key objectives are platform accommodations of advanced active and passive sensors, improved detection, classification, localization, tracking, counter-counter measures, and increased capacity and flexibility to handle multi-sensor data loads. Primary programs being funded during the period identified are the Advanced Active Sonobuoy (AAS), which is a potential replacement for Directional Command Active Sonobuoy System (DICASS) in harsh water and the Advanced Active Adjunct (AAA), which is an air dropped sound source for the Air Deployed Active Receiver (ADAR). Some effort was applied towards evaluation of Counter-Countermeasure (CCM) systems in FY91 and FY92 and participation in the FY91 Ice-Exercise (ICEX).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:
 - a. (U) Enhanced Tactical Surveillance Sonobuoy (ETSS)
 1. (U) Program terminated.
 - b. (U) Advanced Active Sonobuoy (AAS)
 1. (U) Continued requirements definition.
 - c. (U) Airborne Active Adjunct (AAA)
 1. (U) Continued Development Options Paper (DOP) analysis.
 - d. (U) Counter-countermeasures (CCM)
 1. (U) Completed CCM requirements for AAS and AAA.
 2. (U) Initiated Non Development Items (NDI) market investigation for radio frequency (RF) CCM.
 - e. (U) Tactical Arctic Sonobuoy (TAS)
 1. (U) Participated in FY 1991 ICEX.
 2. (U) Reduced data from FY 1990 ICEX.
2. (U) FY 1992 PROGRAM:
 - a. (U) AAS
 1. (U) Complete Milestone I analysis and documentation.
 2. (U) Conduct critical component tests.
 - b. (U) AAA
 1. (U) Complete Milestone I analysis and documentation.
 2. (U) Initiate critical component tests.
 - c. (U) CCM
 1. (U) Evaluate selected NDI RF CCM systems.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603254N BUDGET ACTIVITY: 4-Tactical Programs
PROGRAM ELEMENT TITLE: Air ASW
PROJECT NUMBER: H1292 PROJECT TITLE: Advanced ASW Sensors & Processors

3. (U) FY 1993 PLANS:

a. (U) AAS

1. (U) Complete critical component tests.
2. (U) Commence Demonstration and Validation (DEM/VAL).
3. (U) Develop Advanced Development Model (ADM) specification and

procurement package.

b. (U) AAA

1. (U) Complete critical component tests.
2. (U) Commence DEM/VAL and prepare ADM specification and

procurement package.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NADC, Warminster, PA; NWSC, Crane, IN; NAC, Indianapolis, IN; NCSC, Panama City, FL; NATC, Patuxent River, MD; NOSC, San Diego, CA.

E. (U) COMPARISON WITH 1992/3 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not Applicable.

2. (U) Schedule Changes: Advanced Active Sonobuoy (AAS) Milestone II delayed from 9/93 to 2/97. Airborne Active Adjunct (AAA) Milestone III delayed from 9/94 to 10/95.

3. (U) Cost Changes: Not Applicable.

F. (U) PROGRAM DOCUMENTATION:

AAA	Tentative Operational Requirement (TOR)	4/87
AAS	Tentative Operational Requirement (TOR)	5/86

G. (U) RELATED ACTIVITIES: Program Element 0604261N, Acoustic Search Sensors.

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable

I. (U) INTERNATIONAL COOPERATIVE AGREEMENT: Not Applicable.

J. (U) MILESTONE SCHEDULE:

	MS I	MS II	TOC
AAS	4/93	2/97	
AAA	12/92	10/95	

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603260N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Airborne Mine Countermeasures

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
H0528	Advanced Airborne Mine Countermeasures Equipment	2,131	1,432	1,237	-0-	22,929
H0529	Airborne Minehunting System	13,018	13,651	17,435	Cont.	Cont.
	TOTAL	15,149	15,083	18,672	Cont.	Cont.

B. (U) DESCRIPTION: This program develops airborne mine countermeasures systems that are required to counter known and projected mine threats. Provides a

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603260N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: AIRBORNE MINE COUNTERMEASURES

PROJECT NUMBER: H0528 PROJECT TITLE: ADVANCED AIRBORNE MINE
COUNTERMEASURES EQUIPMENT

C. (U) DESCRIPTION: There is a requirement to expand helicopter mine countermeasures by developing a more effective capability to sweep mines. The A/N37U-1 Controlled Depth Moored Sweep is being developed to

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Completed effectiveness testing.

b. (U) Received competitive proposals for systems for operational testing.

2. (U) FY 1992 PROGRAM:

a. (U) Award contract for additional A/N37U-1 engineering and manufacturing development models to support development and operational testing.

b. (U) Complete fabrication and initiate testing of engineering and manufacturing development models.

3. (U) FY 1993 PLANS: Complete technical and operational evaluations of A/N37U-1.

4. (U) PROGRAM TO COMPLETION: Obtain Approval for Full Rate Production in FY 1994.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVCOASTSYSCEN, Panama City, FL and David Taylor Research Center, Bethesda, MD. CONTRACTORS: To be determined.

F. (U) RELATED ACTIVITIES:

o PE 0602315N, Mine and Special Warfare Technology: Cable fairing and towed body technologies

o PE 0603502N, Surface Mine Countermeasures: Single Ship Deep Sweep

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603260N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AIRBORNE MINE COUNTERMEASURES
PROJECT NUMBER: H0529 PROJECT TITLE: AIRBORNE MINE HUNT SYSTEM

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
H0529 AIRBORNE MINE HUNTING SYSTEM	13,018	13,651	17,435	Cont.	Cont.

B. (U) DESCRIPTION: This project includes a sonar for mine detection and classification, and a system for mine neutralization by explosive charge, with equipment designed to provide

being developed: A/A25E-24 Airborne Mine Neutralization Set to Systems
and AN/AQS-20 Sonar Mine Detecting Set for

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- (U) Airborne Mine Neutralization Set - Completed software development.
- (U) AN/AQS-20 - Conducted developmental testing. Evaluated proposals for engineering and manufacturing development models.

2. (U) FY 1992 PROGRAM:

- (U) Airborne Mine Neutralization - Perform software evaluation. Advertise engineering and manufacturing development contract.
- (U) AN/AQS-20 - Obtain Milestone II. Conduct engineering and manufacturing development design and aircraft installation. Order long lead items. Test highest risk subsystems.

3. (U) FY 1993 PLANS:

- (U) Airborne Mine Neutralization Set - Award contract, complete design, and order long lead items; conduct Preliminary Design Review and Critical Design Review (CDR); initiate fabrication of engineering and manufacturing development models.
- (U) AN/AQS-20 - conduct CDR; initiate fabrication of engineering and manufacturing development models; continue test program.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVCOASTSYSCEN, Panama City, FL; David Taylor Research Center, Bethesda, MD; NSWC DET, Silver Spring, MD; and NAC, Indianapolis, IN. CONTRACTORS: EDO Electro-Acoustic Division, Salt Lake City, UT; others to be determined.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603260N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AIRBORNE MINE COUNTERMEASURES
PROJECT NUMBER: H0529 PROJECT TITLE: AIRBORNE MINE HUNT SYSTEM

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) Technology Changes: None
2. (U) Schedule Changes: Funding restarts the neutralization set development as a result of Desert Storm.
3. (U) Cost Changes: FY 1993: +6,229K increase to emphasize mine hunting systems as a result of Desert Storm Lessons Learned.

F. (U) PROGRAM DOCUMENTATION:

1. (U) Airborne Mine Neutralization Set -
Operational Requirements Document (Document in Review)
Test & Evaluation Master Plan #053-2 (Document in Review)
Integrated Program Summary (Document being drafted)
2. (U) AN/AQS-20 -
Operational Requirements Document (Document in Review)
Test & Evaluation Master Plan #053-3 (Document in Review)
Integrated Program Summary (Document being drafted) COEA (underway)

G. (U) RELATED ACTIVITIES:

- o PE 0602315N, Mine and Special Warfare Technology: Computer-aided detection/classification, cable fairing, and towed body technologies
- o PE 0603502N, Surface Mine Countermeasures: Advanced Minehunting System

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE:

1. (U) Airborne Mine Neutralization Set -
 - a. (U) Complete software verification MAR 92
 - b. (U) Award Engineering & Manufacturing Development contract NOV 92
 - c. (U) Complete Technical Evaluation and Operational Evaluation APR 96
 - d. (U) Approval for Full Rate Production/Milestone III DEC 96
2. (U) AN/AQS-20
 - a. (U) Complete Technical Evaluation and Operational Evaluation I JUL 91
 - b. (U) Complete Advanced Development/Milestone II MAR 92
 - c. (U) Complete Technical Evaluation and Operational Evaluation MAR 97
 - d. (U) Approval for Full Rate Production/Milestone III SEP 97

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603261N Budget Activity: 4
PROGRAM ELEMENT TITLE: TACTICAL AIRBORNE RECONNAISSANCE
PROJECT NUMBER: A0534 PROJECT TITLE: TACTICAL RECONNAISSANCE SYSTEM

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
A0534	Tactical Reconnaissance System	28,516	15,333	15,356	Cont.	Cont.

B. (U) DESCRIPTION: The Tactical Air Reconnaissance Program develops systems to provide timely and highly credible imagery intelligence. Present systems provide such imagery from manned platforms using film based sensors, necessitating a return to base for film processing. Manned reconnaissance, with Electro-Optical (EO), Infrared (IR) and Synthetic Aperture Radar (SAR) sensors can provide both broad coverage and high resolution imagery at extended ranges via data link in near real time. The USMC RF-4Bs were phased out in 1990. A Navy Follow-on Tactical Recce (FOTR) capable aircraft will replace the interim Navy F-14 Tactical Air Reconnaissance Pod System (TARPS). A Navy shipboard readout capability compatible with the Joint Service Imagery Processing System (JSIPS-N) will be used for imagery processing, analysis, and storage.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:
 - a. (U) Continued funding of Advanced Tactical Air Reconnaissance System (ATARS) USMC/USN options.
 - b. (U) Initiated acquisition and integration of clear air "standoff" EO/IR sensor into F/A-18D configuration for Test and Evaluation (T&E).
 - c. (U) Completed design effort and continued development of the JSIPS-N capability.
 - d. (U) Coordinated T&E planning for the JSIPS-N capability.
2. (U) FY 1992 PROGRAM:
 - a. (U) Initiate development test (DT) of ATARS EO/IR sensors and data link.
 - b. (U) Continue development and integration of clear air "standoff" EO/IR sensor.
 - c. (U) Continue JSIPS-N development. Conduct contractor integration and complete T&E planning for JSIPS-N.
 - d. (U) Continue planning for the USN FOTR.
 - e. (U) Initiate training course development for JSIPS-N.

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FY 1993 NAVY RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603261N Budget Activity: 4
PROGRAM ELEMENT TITLE: TACTICAL AIRBORNE RECONNAISSANCE
PROJECT NUMBER: A0534 PROJECT TITLE: TACTICAL RECONNAISSANCE SYSTEM

3. (U) FY 1993 PLANS:
- a. (U) Continue DT of ATARS EO/IR sensors and data link.
 - b. (U) Initiate operational test (OT) of ATARS EO/IR sensors and data link.
 - c. (U) Continue training efforts for F/A-18D(RC).
 - d. (U) Initiate support equipment acquisition for F/A-18D(RC) and USN FOTR.
 - e. (U) Plan test of clear air "standoff" EO/IR sensor.
 - f. (U) Continue planning for USN FOTR.
 - g. (U) Continue JSIPS-N development. Perform DT/OT of JSIPS-N.
 - h. (U) Plan F/A-18 SAR and ATARS/JSIPS-N integration.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRDEVCEM, Warminster, PA; NAVAIRTESTCEM, Patuxent River, MD; NAVWPNCEN, China Lake, CA. CONTRACTORS: Prime for F/A-18C/D(RC) aircraft: McDonnell Aircraft Co., St. Louis, MO; Prime for ATARS EO/IR sensors: Martin Marietta Corp., Orlando, FL; Prime for JSIPS-N: General Dynamics Electronics Division, San Diego, CA and E-Systems, Garland, TX; Prime for "standoff" EO sensor: Loral Fairchild Systems, Syosset, NY.

- E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

- 1. (U) TECHNOLOGY CHANGES: Not Applicable.
- 2. (U) SCHEDULE CHANGES: Not applicable.
- 3. (U) COST CHANGES: Not Applicable.

- F. (U) PROGRAM DOCUMENTATION:

- 1. (U) DON Recce Operational Requirement: 022-05-836 6/84
- 2. (U) USMC F/A-18D(RC) Program Management Proposal: 9/88
- 3. (U) F/A-18D(RC) Test and Evaluation Master Plan: 201-1 Annex B Rev 1 4/90
- 4. (U) JSIPS-N PMP: 7/90
- 5. (U) JSIPS-N TEMP: 1/91

- G. (U) RELATED ACTIVITIES:

- 1. Program Element (PE) 0204136N, F/A-18 Squadrons upgrade Phase II Future Common Appeture Multi-Specutal Sensor call for adding all-weather reconnaissance capability to multi-mission aircraft; Adds SAR imagery mode provisions to radar upgrade.
- 2. Program Element 0206625M, MC INTELL/ELECT Warfare System: Receives EO/IR/SAR imagery.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603261N Budget Activity: 4
PROGRAM ELEMENT TITLE: TACTICAL AIRBORNE RECONNAISSANCE
PROJECT NUMBER: AO534 PROJECT TITLE: TACTICAL RECONNAISSANCE SYSTEM

3. PE 0604710F, Tactical Reconnaissance: Develops common ATARS EO/IR sensor suite as a joint program with Navy (Air Force lead).

H. (U) OTHER APPROPRIATION FUNDS: Applicable airframe appropriations that will include tactical reconnaissance systems is F/A-18.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) MILESTONE SCHEDULE:

1. (U) JSIPS-N MS IIA LRIP	Dec 93
2. (U) ATARS Hardware Development Test (DT/OT) Complete	Nov 93
3. (U) ATARS MS IIA LRIP	Apr 94
4. (U) ECP Initiation of F/A-18 SAR	Jun 94
5. (U) Initiate EO LOROPS Test	Sep 94
6. (U) ATARS Software Fleet Release	Oct 94
7. (U) JSIPS-N MS III	Sep 95
8. (U) ATARS Production System	Oct 95
9. (U) ATARS Follow-on Test & Evaluation (FOT&E) Complete	Dec 96

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603262N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: A/C Survivability and Vulnerability

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0591	A/C Sur & Vul	2,502	4,823	4,576	CONT.	CONT.
W0592	A/C & Ord. Safety	3,045	2,878	4,082	CONT.	CONT.
W1277	Nuclear Survivability A/C (FAANTAEI)	1,659	3,200	3,010	CONT.	CONT.
W1819	CV A/C Fire Suppression Sys	2,021	1,930	2,237	CONT.	CONT.
	TOTAL	9,227	12,831	13,905	CONT.	CONT.

B. (U) DESCRIPTION: Aircraft Survivability & Vulnerability is comprised of four projects to address not only the reductions in aircraft susceptibility to enemy and non-combat threats but also aircraft vulnerabilities to conventional, nuclear, chemical, biological, radiological, and directed energy. The Aircraft Survivability and Vulnerability project expands the survivability technology base and develops prototype hardware which is required to improve the survivability of Naval aircraft. Aircraft and Ordnance Safety ensures that all munitions carried aboard Navy ships be insensitive to fast cook-off (FCO), slow cook-off (SCO), bullet and Fragment Impact (FI), and sympathetic detonation (SD). The Fleet Aircraft Assessment for Navy Testing and Analysis for electromagnetic pulse (EMP) Limitations (FAANTAEI) assesses the vulnerability of tactical aircraft to damage/upset from electromagnetic pulse. CV Aircraft Fire Suppression Systems develop improved firefighting systems (FFS) and fire protective measures for aircraft carriers. Together these projects provide for the survivability and reduced vulnerability of Naval aircraft operating in the maritime environment.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603262N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: A/C Survivability and Vulnerability
PROJECT NUMBER: W0591 PROJECT TITLE: A/C Survivability and Vulnerability

C. (U) DESCRIPTION: This project expands the survivability technology base and develops prototype hardware to improve the survivability of Navy aircraft. This project addresses the likelihood of an aircraft being hit (susceptibility) and the probability of kill if the aircraft is hit (vulnerability). This program has developed prototype hardware for the reduction of vulnerability and susceptibility of Navy aircraft which has been or will be incorporated in production.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Completed Phase III - aircraft modification/prototyping and initiated and completed Phase IV - flight testing of OUTLAW ZEUS program.

2. (U) FY 1992 PLANS:

a. (U) Initiate and Complete Phase II - advanced development of the OUTLAW KNIGHT program.

b. (U) Initiate Phase III - aircraft modification/prototyping of OUTLAW KNIGHT program.

3. (U) FY 1993 PLANS:

a. (U) Complete Phase III - aircraft modification/prototyping of the OUTLAW KNIGHT program.

b. (U) Initiate and complete Phase IV - flight testing OUTLAW KNIGHT program.

c. (U) Develop vulnerability reduction technology for advanced threats including low and moderate powered lasers and chemical and biological threats.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NWC, China Lake, CA; NADC, Warminster PA; PMTC, Ft. Mugu, CA; NRL, Washington, D.C.; Naval Postgraduate School, Monterey, CA. CONTRACTORS: Grumman Aerospace, Bethpage, NY.

F. (U) RELATED ACTIVITIES: P.E. 0605132D, Joint Technical Coordinating Group on Aircraft Survivability, supports joint combat survivability development, test and evaluation programs, activities and ensures no duplication of effort between the Services with respect to survivability programs.

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603262N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: A/C Survivability and Vulnerability
PROJECT NUMBER: W0592 PROJECT TITLE: A/C and Ordnance Safety

C. (U) DESCRIPTION: This project transitions technology from Insensitive Munitions (IM) Advanced Development (Generic Technology) to Air Weapon Systems to comply with CNO direction that all munitions carried aboard Navy ships be insensitive to fast cook-off (FCO), slow cook-off (SCO), bullet and fragment impact (BI/FI), and sympathetic detonation (SD).

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:
 - a. (U) Predicted IM failure modes for Advanced Air-to-Air Missile.
 - b. (U) Completed SD modelling for Advanced Bomb Family (ABF); designed advanced fuze booster.
 - c. (U) Completed demonstration project for BLU-97/B submunition in a joint task with Advanced Interdiction Weapon System (AIWS) and TOMAHAWK Land Attack Missile-Dispenser (TLAM-D).
 - d. (U) Completed the design of an Advanced Medium Range Air-to-Air Missile (AMRAAM) motor using an all composite case.
 - e. (U) Completed a series of successful FCO and SCO tests for the Advanced Rocket System (ARS) unitary warhead.
 - f. (U) Conducted successful FCO tests on HARM rocket motors and SCO tests on BLU-110 bombs with an improved FMU-139 fuze booster.
 2. (U) FY 1992 PROGRAM:
 - a. (U) Conduct SD analysis of candidate unitary warhead/AIWS.
 - b. (U) Verify IM fuze booster with applicability to ABF, now Joint Direct Attack Munition (JDAM).
 - c. (U) Complete IM demo project for ARS M261 submunition warhead.
 - d. (U) Support IM effort in the development of the Navy version of the Air Force BLU-109 penetrator bomb.
 - e. (U) Complete IM testing on composite case rocket motors and conduct small-scale propellant tests for ducted rocket motor applicable AMRAAM.
 - f. (U) Complete IM testing of the HELLFIRE Optimized Missile System (HOMS) improved warhead.
 3. (U) FY 1993 PLANS:
 - a. (U) Demonstrate effectiveness of the advanced design fuze booster applicable to the JDAM.
 - b. (U) Conduct SD demonstration tests on candidate AIWS unitary warheads.
 - c. (U) Conduct IM tests on ducted rocket hardware applicable AMRAAM.
 - d. (U) Demonstrate fuze direct initiation of unitary warheads.
 4. (U) PROGRAM TO COMPLETION: This is a continuing program.
- E. (U) WORK PERFORMED BY: IN-HOUSE: NWC, China Lake, CA; NSWC, Dahlgren, VA. CONTRACTORS: Advanced Ordnance Technology, Inc., Waldorf, MD.
- F. (U) RELATED ACTIVITIES: P.E. 0603609N, Conventional Munitions.
- G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.
- H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603262N BUDGET ACTIVITY: 4
 PROGRAM ELEMENT TITLE: A/C Survivability and Vulnerability
 PROJECT NUMBER: W1277 PROJECT TITLE: Nuclear Survivability A/C (FAANTAEI)

C. (U) DESCRIPTION: The Fleet Aircraft Assessment for Navy Testing and Analysis for Electromagnetic Pulse (EMP) Limitation (FAANTAEI) assesses the vulnerability of tactical aircraft to damage/upset from EMP. FAANTAEI tests verify aircraft hardness and assess the ability of aircraft to perform their mission in an EMP environment. This project also provides research into fiber optic sensors, digital instrumentation, test pulser development, recommended solutions/work-arounds to EMP problems.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Completed S-3B post-test analysis, issued test reports and NATOPS warnings (draft).
- b. (U) Completed pretest planning for E-2C assessment.
- c. (U) Conducted P-3C pre-assessment Quick Look Survey and issued report; conducted complete P-3C assessment, drafted test reports and NATOPS warnings.
- d. (U) Initiated AV-8B pretest analysis and path of entry (POE) definition.
- e. (U) Designed optical sensor engineering model (fiber optics).
- f. (U) China Lake EMP pulser became operational.

2. (U) FY 1992 PROGRAM:

- a. (U) Refurbish Horizontal Polarized Dipole (HPD) pulser.
- b. (U) Develop plans to relocate Vertical Polarized Dipole (VPD).
- c. (U) Issue P-3C test reports and NATOPS warning.
- d. (U) Conduct EA-6B, AV-8B, E-2C HARM and SIDEWINDER assessments.
- e. (U) Verify pulser and site performance.
- f. (U) Develop EMP assessment instrumentation suite.
- g. (U) Assess commercial photonic sensors.
- h. (U) Develop engineering model of optical sensor (crystal).
- i. (U) Research correlation of nuclear EMP, lightning phenomena, high powered microwave (HPM), and ultra wideband (UWB) pulsed power threats and develop assessment methodology.

3. (U) FY 1993 PLANS:

- a. (U) Complete E-2C post test analysis and issue reports.
- b. (U) Conduct AH-1W and CH-53E pretest analysis POE.
- c. (U) Integrate Vertical Polarity Dipole (VPD) at NWC.
- d. (U) Conduct AH-1W, CH-53E, HARPOON and SLAM assessments.
- e. (U) Develop HPM/UWB assessment methodology for aircraft.
- f. (U) Complete development and assessment of optical sensor.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Wash., DC; NAVAIRLANT, Norfolk, VA; NAVAIRPAC, San Diego, CA; NWC, China Lake, CA; NATC, Pax. River, MD; NADC, Warminster, PA. CONTRACTORS: EG&G/WASC/EDM/MANTECH, Lexington Park, MD.

F. (U) RELATED ACTIVITIES: P.E. 0101402N (Project H0793), TACAMO IVE (MP)). U.S. Air Force conducts EMP testing at Air Force Weapons Laboratory, Albuquerque, NM - various programs.

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603262N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: A/C Survivability and Vulnerability

PROJECT NUMBER: W1819

PROJECT TITLE: CV A/C Fire Suppression System

C. (U) DESCRIPTION: This project develops improved firefighting systems and fire protective measures for aircraft related fires on aircraft carriers including assessment of aircraft fire properties, the development of the P-25 firefighting vehicle, and improvements to firefighting agents and delivery systems.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Awarded contract for preliminary design of P-25 firefighting vehicle.
- b. (U) Continued advanced development of flight deck imaging system, video firefighter trainer, ordnance cooling requirements, advanced flight deck fire simulator, and performed full scale fire tests of mixed aviation fuels and lithium.
- c. (U) Evaluated flight deck fire risk of mixed aviation fuels.
- d. (U) Performed fire extinguishment tests with molten lithium.

2. (U) FY 1992 PROGRAM:

- a. (U) Award contract for design and manufacture of P-25 prototypes.
- b. (U) Continue advanced development of flight deck imaging system, video firefighter trainer, ordnance cooling requirements, advanced flight deck fire simulator, and perform full scale fire tests on various aircraft and weapons materials.

3. (U) FY 1993 PLANS:

- a. (U) Design and manufacture of P-25 prototypes.
- b. (U) Develop flight deck imaging system, video firefighter trainer, ordnance cooling requirements, advanced flight deck fire simulator, and perform full scale fire tests on various aircraft and weapons materials.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, DC; NSWC, White Oak, MD; NAEC, Lakehurst, NJ; NWC, China Lake, CA. CONTRACTORS: Not Applicable.

F. (U) RELATED ACTIVITIES: Not Applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603270N

BUDGET ACTIVITY: 2

PROGRAM ELEMENT TITLE: Advanced Electronic Warfare Technology

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1991 ACTUAL	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S2090	Functional Recognition/Response	0	4,894	5,814	CONT.	CONT.
R2141	Advanced Radar Technology	0	0	25,000	CONT.	CONT.
TOTAL		0	4,894	30,814	CONT.	CONT.

B. (U) DESCRIPTION: The Functional Recognition/Response project

The Advanced Radar Technology project is a highly classified program. Details are available at a higher level of classification.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603270N **BUDGET ACTIVITY:** 2
PROGRAM ELEMENT TITLE: Advanced Electronic Warfare Technology
PROJECT NUMBER: S2090 **PROJECT TITLE:** Functional Recognition/Response

C. (U) DESCRIPTION: This program

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Not Applicable.

2. (U) FY 1992 PROGRAM:

3. (U) FY 1993 PLANS:

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: Naval Research Laboratory, Washington DC; PMTC, PT Mugu, CA; NWC, China Lake, CA; NAVSWC, Dahlgren, VA; NATC, Patuxent River, MD; and selected contractors.

F. (U) RELATED ACTIVITIES: This program adheres to Tri-Service Reliance Agreements on Electronic Warfare, with oversight and coordination provided by the Joint Directors of Laboratories.

G. (U) OTHER APPROPRIATION FUNDS: None.

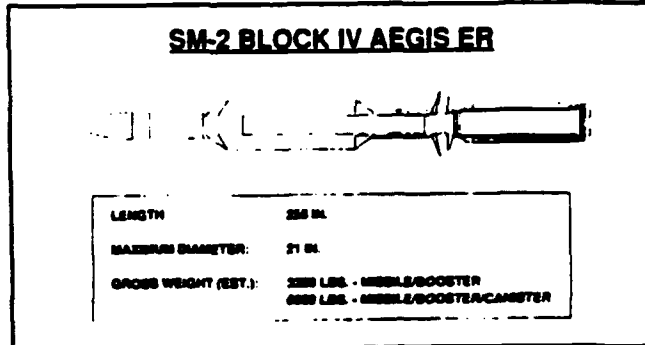
H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603318N BUDGET ACTIVITY: 4
 PROGRAM ELEMENT TITLE: ADVANCED SURFACE-TO-AIR MISSILE
 PROJECT NUMBER: S1632 PROJECT TITLE: AEGIS ER



POPULAR NAME: SM-2 BLOCK IV AEGIS ER

A. (u) SCHEDULE/BUDGET INFORMATION: (DOLLARS IN THOUSANDS)

SCHEDULE*	FY 1991	FY 1992	FY 1993	TO COMPLETE
PROGRAM MILESTONES				
ENGINEERING MILESTONES	1ST FLT 7/91			
T&E MILESTONES				
CONTRACT MILESTONES				PROD 1QTR/94

* NOTE: Milestone changes due to removal of concurrency and delays in flight testing at WSMR.

BUDGET (\$K)	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
MAJOR CONTRACT	37,995	26,560	13,496	CONTINUING PROGRAM
SUPPORT CONTRACT	0	0	0	CONTINUING PROGRAM
IN-HOUSE SUPPORT	5,061	7,944	4,533	CONTINUING PROGRAM
GFE/OTHER	0	0	0	CONTINUING PROGRAM
TOTAL	43,056	34,504	18,029	CONTINUING PROGRAM

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603318N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ADVANCED SURFACE-TO-AIR MISSILE
PROJECT NUMBER: S1632 PROJECT TITLE: AEGIS ER

B. (U) DESCRIPTION: The AEGIS ER missile is the latest member of the STANDARD Missile family of area defense missiles, specifically designed to take This missile, also known as SM-2 Block IV, builds upon the SM-2 Block IIIA baseline with its Adding significant propulsion, guidance and control enhancements, AEGIS ER extends STANDARD Missile engagement capability to very.

The resulting extension of the STANDARD Missile engagement envelope will permit utilization of the

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Conducted restrained firing at White Sands Missile Range (WSMR).
- b. (U) Completed round integration and hardware-in-loop tasks on Propulsion/Control Test Vehicle (P/CTV).
- c. (U) Conducted P/CTV firings at WSMR.
- d. (U) Began booster qualification tests for lead contractor and planning for booster qualification test for follower.
- e. (U) Planned for Guidance Test Vehicle (GTV) flight testing at WSMR.
- f. (U) Began fleet introduction tasks.
- g. (U) Conducted AEGIS tactical operations program Preliminary Design Review (PDR), Phase 1.

2. (U) FY 1992 PROGRAM:

- a. (U) Continue flight tests at WSMR, for P/CTV and GTVs.
- b. (U) Complete AEGIS Tactical Operations Program PDR, Phase 2.
- c. (U) Complete safety hazards and E-cubed testing.

3. (U) FY 1993 PLANS:

- a. (U) Conduct
- b. (U) Complete assessment of Block IV performance based on flight test results and simulator work.
- c. (U) Conduct Production Readiness Review (PRR), 2nd QTR.
- d. (U) Support
- e. (U) Support production transition engineering tasks for BLK IV.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NWC, China Lake, CA; NSWC, Dahlgren, VA; NOS, Indian Head, MD. CONTRACTORS: Johns Hopkins University, APL, Laurel, MD; Raytheon Company, Bedford, MA; General Dynamics, Pomona, CA; Motorola GEG, Scottsdale, AZ; Allied Signal, Communications Division, Baltimore, MD; G.E. GSD, Moorestown, NJ..

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603318N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ADVANCED SURFACE-TO-AIR MISSILE
PROJECT NUMBER: S1632 PROJECT TITLE: AEGIS ER

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: Not Applicable.
2. (U) SCHEDULE CHANGES: Propulsion test vehicle flight test at WSMR planned for 3-4QTR/91 will extend into FY92. GTV testing at WSMR delayed until 3QTR/92.
3. (U) COST CHANGES: Not Applicable.

F. (U) PROGRAM DOCUMENTATION:

AP 541-86 approved 3/87
PRM signed 6/87
J&A approved 4/87
PMP 87-01 approved 4/87
TEMP 623-2, approved by ASN 11/90 and forwarded to OSD, has been returned for schedule update.
DCP and TEMP under revision to reflect schedule and production funding changes.

G. (U) RELATED ACTIVITIES: PE 0604366N, STANDARD Missile Improvement Program supports development of SM-2 Block IIIA Ordnance section to be provided as GFE.

H. (U) OTHER APPROPRIATION FUNDS: (DOLLARS IN THOUSANDS)

WEAPONS PROCUREMENT, NAVY:

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
P1 LI-9					
(U) FUNDS	0	74,800*	0	CONTINUING PROGRAM	
(U) QUANT	0	0	0	CONTINUING PROGRAM	

*Long lead material to be obligated 12/92.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) TEST AND EVALUATION: This information is included in the FY 1993 Congressional Data Sheets.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603321N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ADVANCED AIR-TO-AIR MISSILE
PROJECT NUMBER: E1671 PROJECT TITLE: AAAM

PICTURE NOT AVAILABLE

POPULAR NAME: AAAM

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program				
Milestones				
Engineering	SCTV FAB	HARDWARE		
Milestones	HWIL	DEMOS		
T&E Contract				
Milestones	PFRT			
BUDGET (\$K)	FY 1991	FY 1992	FY 1993	Program Total To Complete
Major				256,147
Contract	88,402	76,145	0	0
Support				1,431
Contract	605	326	0	0
In-House				35,301
Support	6,960	7,505	0	0
GFE/				15,565
Other	5,057	4,500	0	0
TOTAL	101,024	88,476	0	308,444
				0

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603321N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ADVANCED AIR-TO-AIR MISSILE
PROJECT NUMBER: E1671 PROJECT TITLE: AAAM

B. (U) DESCRIPTION: The Advanced Air-to-Air Missile (AAAM) was a high energy, multi-mode, multi-spectrum long range missile designed for carriage by multiple aircraft in both the maritime Power Projection and Air Superiority mission areas. These missions include, a) support of the classical air superiority campaign, b) strike protection and c) maritime air superiority. These missions include fighter, bomber, fighter-bomber, command and control and anti-ship missile threats. With the proliferation of modern aircraft and weapons to third world nations, AAAM was designed to counter the regional as well as the global threat.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:

a. (U) Commenced Hardware-in-the-Loop (HWIL) simulation laboratory development, fabrication of control test vehicles and aircraft integration. Completed fabrication of radio frequency and infrared sensor hardware. Began assembly, integration and component testing of sensors. Completed fabrication of all separation and control test vehicles (SCTV's) hardware. Began assembly, integration and testing of SCTV's. Began construction and test firing of rocket and ramjet motors. Commenced preparation and planning for the launch of jettison test vehicles (JTV's) and ground launch of SCTV's.

2. (U) FY 1992 Program: The AAAM Program was terminated during the execution of FY 1992. FY 1992 remaining funds will enable DEM/VAL contracts close-out and complete the integration of seeker hardware and software and conduct lab/field tests on seekers.

3. (U) FY 1993 Program: Not Applicable.

D. (U) WORK PERFORMED BY: IN-HOUSE: NWC, China Lake, CA; PMTC, Point Mugu, CA; NADC, Warminster, PA. CONTRACTORS: H&R Company (Hughes/Raytheon), Canoga Park, CA; General Dynamics/Westinghouse AAAM Joint Venture, Pomona, CA.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: Program terminated by the end of FY 1992.

2. (U) SCHEDULE CHANGES: Program terminated prior to Milestone II.

3. (U) COST CHANGES: Decision to terminate removes all funding from FY 1993 to Completion.

F. (U) PROGRAM DOCUMENTATION:

DOP	MAR 86
TEMP	JUL 88
SCP	AUG 88
OR	MAR 87

G. (U) RELATED ACTIVITIES: None.

H. (U) OTHER APPROPRIATION FUNDS: None.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) TEST AND EVALUATION: None.

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FY 1993 RDT&E, N, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603451N

BUDGET ACTIVITY: 3

PROGRAM ELEMENT TITLE: Tactical Space Operations

A. (U) RESOURCES: (Dollar in Thousands)

PROJECT NUMBER	TITLE	FY1991 ACTUAL	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X1846	NTL SYS ENH TACT SUPP	1,271	2,738	483	377	CONT.
X2055	Space Surveillance Development	0	1,415	1,532	CONT.	CONT.
	TOTAL	1,271	4,153	2,015	CONT.	CONT.

B. (u) DESCRIPTION:

in ocean areas and related coastal zones where U.S. Naval forces may be employed. Tactical support information will provide for battle force management. This program will allow for key allied co-development of spacecraft components through international cooperative cost-sharing. Together, these projects allow the fleet to develop and maintain an essential wide area surveillance capability

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FY 1993 RDT&E, N, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603451N

BUDGET ACTIVITY: 3

PROGRAM ELEMENT TITLE: Tactical Space Operations

PROJECT NUMBER: X2055 PROJECT TITLE: Space Surveillance Development

C. (U) DESCRIPTION:

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Not Applicable.

2. (U) FY 1992 PROGRAM:

a. (U) Establish New Start.

b. (U)

c. (U) Develop proof-of-concept hardware.

3. (U) FY 1993 PLANS:

a. (U)

b. (U)

4. (U) PROGRAM TO COMPLETION:

a. (U) Evaluate test results for possible technology transfer to space-based surveillance programs.

b. (U) Continue ongoing International Cooperative Project.

c. (U) Evaluate maturing technologies as to applicability to space-based surveillance programs.

d. (U) This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: Naval Research Lab (NRL), Washington,

DC. CONTRACTOR: None.

F. (U) RELATED ACTIVITIES: Not Applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: International Exchange Program (IEP-1987-UK-DOD-02,24 Sep 87) on exchange of space-based radar, infrared, and radiometry technical data with the United Kingdom.

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FY 1993 RDT&E,N, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603451N

BUDGET ACTIVITY: 3

PROGRAM ELEMENT TITLE: Tactical Space Operations

PROJECT NUMBER: X1846 PROJECT TITLE: NTL SYS ENH TACT SPPT

C. (U) DESCRIPTION:

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Continued software conversion to Ada (Phase III) within USAF SYS-1 upgrade to DSP.

2. (U) FY 1992 PROGRAM:

- a. (U) Introduce SYS-1 to operational status.**
- b. (U) Begin Tactical Ground Station development.**
- c. (U) Continued software conversion to Ada.**
- d. (U) Begin systems integration**

3. (U) FY 1993 PLANS:

- a. (U) Integrate Tactical Ground Station development.**
- b. (U) Complete Tactical Ground Station development.**

4. (U) PROGRAM TO COMPLETION:

- a. (U) Complete full operational capability of Tactical Ground Station.**
- b. (U) Introduce Tactical Ground Station to operational status.**
- c. (U) This program completes in FY 1996.**

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVSPASISACT, Los Angeles, CA; NAVSWC, Dahlgren, VA. CONTRACTOR: IBM, Boulder, CO; Aerospace Corp., Los Angeles, CA.

F. (U) RELATED ACTIVITIES: Program Element 0102431F, Air Force Defense Support Program.

G. (U) OTHER APPROPRIATION FUNDS: (Dollar in Thousands)

(U) PROCUREMENT: (P-1 Line Item)

	FY1991 ACTUAL	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN #101	0	0	4,400	5,500	10,000

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603502N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Surface Mine Countermeasures

A. (U) RESOURCES: (Dollars in thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0260	Minehunt	7,226	11,086	16,279	Cont.	Cont.
S1233	MCM Improvements	14,354	9,595	10,648	Cont.	Cont.
S2131	Shallow Water Mine Countermeasures	0	8,700	17,546	Cont.	Cont.
	TOTAL	21,580	29,381	44,473		

B. (U) DESCRIPTION: The program provides for developments to combat the threat of known and projected foreign mines against U.S. Naval and merchant shipping in harbors, channels, choke points, sea lines of communications, and amphibious and other fleet operating areas. It develops: (1) systems and support for systems which will detect, localize, and counter moored, bottom, mines down to water depths of for use in MCM-1 Class, MHC-51 Class, and other surface ships; (2) systems for detecting, neutralizing and sweeping mines from shallow water, very shallow water, surf zones, and beach landing craft zones in support of amphibious operations.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603502N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface Mine Countermeasures
PROJECT NUMBER: S0260 PROJECT TITLE: Minehunt

A. (U) RESOURCES: (Dollars in thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0260	Minehunt	7,226	11,086	16,279	Cont.	Cont.

B. (U) DESCRIPTION: Efforts made include: (1) AN/SQQ-32 variable depth minehunting sonar for MCM-1 and MHC-51 ships; (2) Detecting mines buried in sea bottom; and (3) Remotely controlled minehunting systems for non-MCM platforms..

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:
 - a. (U)AN/SQQ-32: Continued limited production, completed environmental qualification testing.
 - b. (U)Remote Minehunting: Completed Development Options Paper (DOP) documentation.
 - c. (U)Buried Mine Detection: Developed requirements documentation.
2. (U) FY 1992 Program:
 - a. (U)AN/SQQ-32: Begin Preplanned Product Improvement (P³I) program. Conduct TECHEVAL and begin OPEVAL.
 - b. (U)Buried Mine Detection System: Complete requirements documentation.
 - c. (U)Remote Minehunting System: Continue requirements documentation.
3. (U) FY 1993 Plans:
 - a. (U)AN/SQQ-32: Complete OPEVAL and FOT&E on Production System in MCM-10. Develop various P³I.
 - b. (U)Buried Mine Detection: MS I award Advanced Development Model (ADM) contract with PSED option.
 - c. (U)Remote Minehunting: Complete requirements documentation.
4. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: In-House: NCSS, Panama City, FL; NWSC, Crane, IN; NSWC, White Oak, MD; NOS, Indian Head, MD; NOSC, San Diego, CA. Contractors: Raytheon, Portsmouth, RI; Thomson-Sintra, Brest, France.

E. (U)COMPARISON WITH FY 1992/93 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not Applicable.
2. (U) SCHEDULE CHANGES: Not Applicable.
3. (U) COST CHANGES: FY 1993 Increase to fund AN/SQQ-32 P³I program and Buried Mine Detection System ADM contract.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603502N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface Mine Countermeasures
PROJECT NUMBER: S0260 PROJECT TITLE: Minehunt

F. (U) PROGRAM DOCUMENTATION:

AN/SQQ-32: TEMP 005-4 REV. 1 approved 8/12/91 by Director Navy Test & Evaluation & Technical Requirements.

BURIED MINE DETECTION: OR #282-03-92 dated 3/26/91

REMOTE MINE HUNT: TOR of 6/27/89; DOP forwarded to CNO. Not yet approved.

G. (U) RELATED ACTIVITIES: PE 0603260N Airborne Mine Countermeasures; Remote Minehunting studies and NATO PG26 have remote vehicles and sensors under development or study.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT					
MCM/MHC	0/2	0/3	0/2	0/0	
SCN #18/19	27,464	45,173	31,637	0	104,274
MCM (SQQ-32 backfit)		1	1	6	
OPN #84		11,577	12,269	78,605	102,451
MCM (SQQ-32 Replacement Towed Body)	1				
OPN #84	4,654	0	0	0	4,654

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE:

AN/SQQ-32: MS IIIB FY 1993,

BURIED MINE DETECTION: MS I FY 1993, MS II FY 95, MS III FY 1999,

REMOTE MINE HUNT: TBD

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FY 1993 RDT&E NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603502N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface Mine Countermeasures
PROJECT NUMBER: S1233 PROJECT TITLE: Mine Countermeasures Improvements

A. (U) RESOURCES: (Dollars in thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1233	MCM Improvements	14,354	9,595	10,648	Cont.	Cont.

B. (U) DESCRIPTION: This project develops: (1) AN/SSN-2(V) Precise Integrated Navigation; (2) AN/SLQ-53 modular mechanical Single Ship Deep Sweep (SSDS); (3) AN/SSQ-94 onboard Combat System Trainer for MCM and MHC ships; (4) Closed Loop Degaussing (CLD) to improve survivability of mine countermeasures ships; (5) Influence Sweep Upgrade to counter future threats; (6) Mechanical Sweep Upgrade and (7) MP3 upgrade to the AN/SLQ-48 to provide destruction of moored mines in place.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:
 - a. (U) AN/SSN-2(V): Conducted Phase III system integration and test. Installed test system in MCM-2.
 - b. (U) AN/SLQ-53: Completed document preparation.
 - c. (U) AN/SSQ-94: Completed systems requirement review; ordered AN/SLQ-48, AN/SYQ-13, and AN/SQQ-32 hardware.
2. (U) FY 1992 Program:
 - a. (U) AN/SSN-2: Conduct Phase III TECHEVAL and begin OPEVAL.
 - b. (U) AN/SLQ-53: MS II, award winch and A/N37U-1 contracts.
 - c. (U) AN/SSQ-94: Conduct preliminary and critical design reviews for AN/SLQ-48 module.
 - d. (U) CLD: Transition from Nunn Program.
3. (U) FY 1993 Plans:
 - a. (U) AN/SSN-2 Complete OPEVAL, MS III, Award Contract for Tactical Displays.
 - b. (U) AN/SLQ-53: Conduct DT-IIA.
 - c. (U) AN/SSQ-94: Conduct preliminary and critical design reviews for AN/SQQ-32 module. Integrate and test AN/SLQ-48 module.
 - d. (U) CLD: MS II; Continue development.
 - e. (U) MP3 for AN/SLQ-48: Commence development, MS II.
4. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: In-House: NCSS, Panama City, FL; NWSC, Crane, IN; NMWEA, Yorktown, VA; NSWC, White Oak, MD; DTRC, Annapolis, MD.
Contractors: None.

E. (U) COMPARISON WITH FY 1992/93 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not Applicable.
2. (U) SCHEDULE CHANGES: Not Applicable.
3. (U) COST CHANGES: +\$1,143K to fund MP3 upgrade to AN/SLQ-48 and DBOF pricing adjustments.

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FY 1993 RDT&E NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603502N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface Mine Countermeasures
PROJECT NUMBER: S1233 PROJECT TITLE: Mine Countermeasures Improvements

F. (U) PROGRAM DOCUMENTATION:

AN/SSN-2: OR-1026-CC dated 4 November 1977; TEMP #005-2 (Rev2) dated 25 April 1989.
AN/SLQ-53(SSDS): OR S-1163-MW dated 8 March 1983
AN/SQQ-94: NAPDD Approved 20 September 1990.
CLOSED LOOP DEGAUSSING: OR #060-03-88 dated 19 December 1985
INFLUENCE SWEEP UPGRADE: Lessons Learned Desert Storm
MECHANICAL SWEEP UPGRADE: OR-S-1163-MW dated 8 March 1983
MP3: Lessons Learned Desert Storm

G. (U) RELATED ACTIVITIES: PE 0603260N, Airborne mine countermeasures is developing the NAVAIR A/M37U-1 controlled depth helicopter sweep which is to be adapted for Single Ship Deep Sweep (SSDs).

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT					
OPN (SSN-2) #84	0	(6) 8,200	(6) 8,400	(4/16) 5,600/3,500	25,700
backfit					
OPN (SSDs) #25	0	0	0	25,400	25,400
OPN (SQQ-94) #84	0	0	0	10,040	10,040

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Signed MOU with France on Closed Loop Degaussing.

J. (U) MILESTONES SCHEDULE:

AN/SSN-2: MS III (Phase III) FY 1993
AN/SLQ-53(SSDs): MS II FY 1992, MS III FY 1995
CLOSED LOOP DEGAUSSING: MS II FY 1993, MS III FY 1997,
IOC FY 2000.
INFLUENCE SWEEP UPGRADE: MS II FY 1997,
MP3: MS II FY 1993, MS III FY 1997,

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FY 1993 RDT&E NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603502N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface Mine Countermeasures
PROJECT NUMBER: S2131 PROJECT TITLE: Shallow Water Mine Countermeasures

A. (U) RESOURCES: (Dollars in thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S2131	Shallow Water MCM	0	8,700	17,546	Cont.	Cont.

B. (U) DESCRIPTION: This program develops system for surface and subsurface platforms to carry out mine-countermeasure missions in support of amphibious warfare, in water 0-40ft deep and shoreward to the beach landing zone. The program includes USN/USMC projects addressing mine reconnaissance, mine hunting, mine sweeping and explosive mine clearance. Included are the Semi-Autonomous Undersea Vehicles (SAUVs), High-Speed Remote Influence System (HSRIS), Distributed Explosives Technology (DET), Improved Line Charge (ILC), Obstacle Breaching System (OBS), and Breached Lane Navigation System (BLNS).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments: Not Applicable
2. (U) FY 1992 Program: Milestone I for umbrella program. Proceed with advanced development; MCM Study by National Academy of Science Naval Studies Board.
3. (U) FY 1993 Plans:
 - a. (U) HSRIS: Continue system design analysis.
 - b. (U) DET: MS I Continue Advanced Development.
 - c. (U) ILC: Milestone I Complete Fuse, Warhead, line charge, container and parachute development, Initiate sub-system fabrication for DT/OT.
 - d. (U) OBS: Determine obstacle vulnerability to explosive and non-explosive countermeasures, continue Advanced Development.
 - e. (U) BLNS: Milestone I; Complete system design for Mechanical Marker; fabricate ADM, concept demonstration. Electronic Marker - Procure Non-developmental Item (NDI) system, concept demonstration.
4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: In-House: NCSS, Panama City, FL; NWSC, Crane, IN; NHWEA, Yorktown, VA; NSWC, White Oak, MD; NOS Indian Head, MD. Contractors: TBD.

E. (U) COMPARISON WITH FY 1992/93 PRESIDENTS BUDGET:

1. (U) TECHNOLOGY CHANGES: Not Applicable.
2. (U) SCHEDULE CHANGES: Not Applicable.
3. (U) COST CHANGES: +17.546M to continue congressionally directed effort established in FY-92.

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FY 1993 RDT&E NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603502N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface Mine Countermeasures
PROJECT NUMBER: S2131 PROJECT TITLE: Shallow Water Mine Countermeasures

F. (U) PROGRAM DOCUMENTATION:

Shallow Water MCM: TOR 3/89
(Overall) DOP 5/91
MMS In Staffing at OPNAV

Following ORDs are in Final Review:
ORD SWMCM Reconnaissance and Detection
ORD SWMCM Marking
ORD SWMCM Mine/Obstacle Clearance

Sub projects: SAUVS:ORD Annex FY 1995
HSRIS:ORD Annex FY 1992
DET: ORD Annex 3rd Qtr FY 1992
ILC: ORD Annex 2nd Qtr FY 1992
OBS: ORD Annex 3rd Qtr FY 1992
ELNS: ORD Annex 3rd Qtr FY 1992

G. (U) RELATED ACTIVITIES: PE 0603782N for Shallow Water MCM Demonstration SUAV Technology at Woods Hole Oceanographic Institute (WHOI), Unmanned Underwater Vehicle (UUV) program at DARPA; Royal Swedish Navy Self-propelled Acoustic Magnetic sweep (SAM) and Remotely Operated Mine Craft (Air Cushioned) (ROMAC) remote controlled influence sweep programs; German Navy Troika influence sweep systems, PE 0603260N for Airborne Mine Countermeasures; PEs 0603640M and 0602131M Distributed Explosive Mine Neutralization System (DEMNS) and DET; USMC MK 58 line charges.

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULES:

- a. MS I 4th Quarter FY 1992 (Initial program)
- b. Individual MS III: SAUVS FY 2005, HSRIS FY 1999, DET FY 1997, ILC FY 1995, OBS FY 1997, ELNS FY 1997.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603504N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Advanced Submarine ASW Development
PROJECT NUMBER: 80223 **PROJECT TITLE:** Submarine Sonar Improvements
 (Advanced)

A. (U) RESOURCES: (Dollars in thousands)						
PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE CONT	TOTAL PROGRAM CONT
SO223	Submarine Sonar Improvements (Advanced)	32,542	30,902	33,810		

B. (U) DESCRIPTION: This program supports the advanced development and testing of improvements to present and future sonar and combat control systems. The goal is to maintain clear acoustical, tactical and operational superiority over the entire spectrum of submarine and surface combatant threats. Prototype hardware and/or software systems are developed under this program to demonstrate technologically promising system concepts in an at-sea submarine environment. Technology areas specific to this program include transducers, hull mounted and towed arrays, onboard sonar signal processing, target motion analysis (TMA), multiple contact processing, weapons presets and post-launch weapon control, and test and evaluation.

C. U PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:

a. (U) Advanced Combat Control. Modified Target Motion Analysis Improvement (TMAI) Advanced Development Model (ADM) to reprocess and analyze Pacific Submarine ASW Exercise (PACSUBASWEX) 1-91 towed array heading sensor data. Completed and demonstrated Multi-Sensor Track Association algorithm providing contact management function for the Multi-Target Management ADM. Developed and implemented techniques to define target evasion state and display the resulting positional distribution utilizing the TMA system solution and the selected evasion hypothesis.

b. (U) Advanced Hull Array Systems. Completed testing of Advanced Mine Detection System high frequency sonar hydrophone panels and selected optimized hydrophone design. Completed testing and analysis of adaptive noise canceling hydrophones. Completed acceptance testing of Extended Sensors.

c. U) Advanced Processing. - Completed RANGEX 1-90 benchmark analysis of Navy and industry multibeam (TAP) systems. Tested algorithm as part of twinline towed array sea test. Completed the functional design of Multipath Ranging and Depth Estimation (GRADE) III automated processor.

d. (u) Advanced Towed Arrays. Successfully completed sea tests of the twinline towed array, the Hybrid Eel array telemetry system and the All Optical Towed Array (AOTA) system. Completed detailed design of Towed Array (MLTA) handling system and the MLTA telemetry specification. Completed design of positive-neutral TB-23 tow cable.

e. (U) Test and Evaluation. Completed reconstruction and preliminary analysis of RANGEX 1-90 data. Completed detailed planning for execution of RANGEX 1-92 sea test.

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FY 1993 RDTGE, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603504N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Advanced Submarine ASW Development

PROJECT NUMBER: 80223

**PROJECT TITLE: Submarine Sonar Improvements
(Advanced)**

2. (U) FY 1992 Program:

a. (U) Advanced Combat Control. Conduct sea tests of TMAI ADM to include automatic propagation path determination, dual tow TMA and automated solution quality assessment. Conduct laboratory based testing of Multi-Target Management ADM.

b. (U) Advanced Hull Array Systems. Conduct lake test of one-quarter scale Advanced Mine Detection System (AMDS) high frequency sonar. Complete algorithm development for adaptive noise cancellation technologies. Initiate Low Cost Wide Aperture Array studies, analysis and component testing. Complete design and initiate procurement of Very Low Frequency Sound Source (VLFSS) electronics.

c. (U) Advanced Processing. Conduct at-sea testing of Advanced Two Dimensional, algorithm. Continue development of Multipath Ranging and Depth Estimation (GRADE III) ADM. Initiate and complete threat and system impact analysis, and fabricate prototype hardware for a submarine sonar. Conduct at-sea tests of TAP ADM

d. (U) Advanced Towed Arrays. Complete contract awards for concepts and processing schemes. procurement of telemetry system, handling system, array processors, sensors, and mechanical components of the Towed Array (MLTA) system. Finalize optimal design and initiate procurement of a universal submarine towed array handling system. Take delivery of neutral-positive tow cables and develop TEMPALT packages for tow cables in support of Variable Depth Submarine Towed Array (VDSTA) development.

e. (U) Test and Evaluation. Initiate system engineering and performance analysis for cost and operational effectiveness assessments of advanced submarine sonars. RANGE 1-92 conducted in 10FY92.

3. (U) FY 1993 Plans:

a. (U) Advanced Combat Control. Conduct sea test of Advanced Targeting and Weapon Management ADM.

b. (U) Advanced Bull Array Systems. Conduct ANDS high frequency receive array sea test. Conduct Extended Sensor at-sea testing. Complete flank array sensor development. Continue component testing and development of Low Cost Wide Aperture Array.

c. (U) Advanced Processing. Continue LFA development. Continue development of (AD/AC) technologies, conduct at-sea testing of submarine spherical and towed arrays utilizing these detection and classification algorithms. Continue MRADE III development. Continue TAP ADM development; conduct sea tests designed for data collection of biologics and combatant ship acoustical events.

d. (U) Test and Evaluation. Continue system performance and cost analysis in support of Cost Operational Effectiveness Analysis (COEA) efforts for advanced submarine sonars. Finalize plans and conduct RANGEX 1-93.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603504N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Submarine ASW Development (Advanced)
PROJECT NUMBER: 80223 PROJECT TITLE: Submarine Sonar Improvements (Advanced)

4. (U) Program to Completion: This is a continuing program.

D. (U) WORKED PERFORMED BY:
IN-HOUSE: NUSC, New London, CT and Newport, RI; Naval Post Graduate School, Monterey, CA; NRL, Washington, DC and Orlando, FL; DTRC, Bethesda, MD.
CONTRACTORS: Analysis & Technology Inc., North Stonington, CT; Sonalysts Inc., Waterford, CT; ARL/University of Texas, Austin, TX.

E. (U) COMPARISON WITH REVISED FY 1992/3 PRESIDENT'S BUDGET:
1. (U) Technology changes: Not Applicable.
2. (U) Schedule changes: Not Applicable.
3. (U) Cost changes: The increase of \$1275K in FY 1993 will be applied to risk reduction in conducting additional testing of the subprojects within the 80223 Project.

F. (U) PROGRAM DOCUMENTATION: NAPDD #237-02, May 90

G. (U) RELATED ACTIVITIES: PE 0602314N, Undersea Surveillance and Weapon Technology; PE 0603562N, Project S1739, Submarine Arctic Warfare Development; PE 0604503N, Project P0219, Submarine Sonar Improvements (Engineering)

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE:

(U) THAI ADM Sea Tests	1QFY92
(U) RANGEK 1-92	1QFY92
(U) AMDS Array Lake Test	1QFY92
(U) VLPSS Design/Fabrication	3QFY92
(U) TAP ADM Sea Test	4QFY92
(U) AMDS Receive Array Sea Test	1QFY93
(U) LFA Sea Test	2QFY93
(U) VDSTA Sea Test	2QFY93
(U) Sea Test	3QFY93
(U) TAP ADM Sea Test	3QFY93
(U) AD/AC Sea Test	4QFY93
(U) RANGEK 1-93	4QFY93

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603506N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface Ship Torpedo Defense

A. (U) RESOURCES: (Dollars in thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0225	Surface Ship Torpedo Defense	34,802	26,632	3,071	Cont Prog	Cont Prog
S2045	Joint US/UK SSTD Project	16,704	30,404	25,408	Cont Prog	Cont Prog
	TOTAL	51,506	57,036	28,479	Cont Prog	Cont Prog

B. (U) DESCRIPTION: The Surface Ship Torpedo Defense (SSTD) Program is comprised of the US National SSTD Program and the US/UK SSTD Joint Project:

(U) S0225 - The US National SSTD Program will initially provide torpedo defense for

(U) S2045 - The US/UK SSTD Joint Project is a collaborative program to design, develop, and produce an anti-torpedo self defense capability for USN and RN combatant, amphibious, and auxiliary surface ships. The program addresses

The US/UK SSTD system will maximize the use of existing ship equipment and be modular to readily fit the US/UK ship market.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603506N BUDGET ACTIVITY: 4
 PROGRAM ELEMENT TITLE: Surface Ship Torpedo Defense (SSTD)
 PROJECT NUMBER: 80225 PROJECT TITLE: Surface Ship Torpedo Defense

POPULAR NAME: SURFACE SHIP TORPEDO DEFENSE (SSTD)

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program			SSTD MSIII	
Milestones			Dec/FY 93	
Engineering	Detec/MOD 7	Detec/MOD 7		
Milestones	PCA 4/91	PCA 4/92		
T&E	In-Water	DTII 1/92		
Milestones	Tests 6/91	OTII 5/92		
Contract	EDM DELIV		SSTD PROD	
Milestones	9/91		Awards	
			Dec/FY 93	
BUDGET (\$K)	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL
Major				TO COMPLETE
Contract	16.935	10.839		
Support				
Contract	1.318	954	54	
In-House				
Support	16.449	14.689	2.942	
GFE/				
Other	100	150	75	
TOTAL	34.802	26.632	3.071	Cont Prog

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603506N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface Ship Torpedo Defense (SSTD)
PROJECT NUMBER: 80225 PROJECT TITLE: Surface Ship Torpedo Defense

B. (U) DESCRIPTION: The US National SSTD Program will initially provide torpedo defense for:

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:
 - a. (U) Delivered EDMs.
 - b. (U) Began installation and check out of detection and launch system aboard the TECHEVAL ship.
 - c. (U) Conducted environmental, safety, and acceptance testing of the Ordnance Alteration (ORDALT) Kit.
 - d. (U) Integrated ORDALT Kit into the EDMs.
 - e. (U) Began to proof Torpedoes for TECHEVAL.
 - f. (U) Completed development of support equipment.
 - g. (U) Conducted Functional Configuration Audit (FCA) of the SSTD Detection, Torpedo, and launch systems.
 - h. (U) Conducted a Production Readiness Review (PRR) on the detection system and Torpedo ORDALT.
2. (U) FY 1992 PROGRAM:
 - a. (U) Conduct SSTD TECHEVAL.
 - b. (U) Conduct SSTD OPEVAL.
 - c. (U) Conduct preliminary Physical Configuration Audits (PCA) on the SSTD Detection system and Torpedo ORDALT.
 - d. (U) Complete Production Readiness Review.
 - e. (U) Conduct the maintenance demonstration of the SSTD system.
 - f. (U) Conduct Logistic Review Audit of the SSTD system.
3. (U) FY 1993 PLANS:
 - a. (U) Receive Milestone III approval for SSTD system.
 - b. (U) Award production contracts.
4. (U) PROGRAM TO COMPLETION: This is a continuing program.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603506N BUDGET ACTIVITY: 4
 PROGRAM ELEMENT TITLE: Surface Ship Torpedo Defense (SSTD)
 PROJECT NUMBER: 80225 PROJECT TITLE: Surface Ship Torpedo Defense

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVCOASTSYSCEN, Panama City, FL; NUSC, New London, CT; NAVSEACOMBATSYSENGSTA, Norfolk, VA; NAVOCEANSYSCEN, San Diego, CA; NAVSWC, White Oak, MD; NAVUSEKAWARENGSTA, Keyport, WA. CONTRACTORS: General Electric, Syracuse, NY; Alliant Techsystems, Hopkins, MN.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:
 1. (U) Technical changes: Not Applicable.
 2. (U) Schedule changes: Not Applicable.
 3. (U) Cost changes: FY 1993 +\$2,201K to support documentation to support a Milestone III decision.

F. (U) PROGRAM DOCUMENTATION:

ASP	7/84
OR	3/85
AP	6/89
DCP	1/90
TEMP	1/90

G. (U) RELATED ACTIVITIES: Not Applicable.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT:					
SSTD	25,792	25,944	46,313	Cont Prog	Cont Prog
OPN #57					
(u)	0	0	38,059	Cont Prog	Cont Prog
WPN #35					

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: A US/UK SSTD Joint Project Memorandum of Understanding (MOU) was signed 26 October 1988. The agreement covers Concept Evaluation (CE), Demonstration and Validation (DEV), Engineering and Manufacturing Development (EMD), and Production with a requirement for national "decisions to proceed" between phases. A Joint Feasibility Study was conducted in FY 88/89/90 with the United States providing Munn funding (PE 0603790N, "NATO Cooperative Research and Development") and the United Kingdom providing matching funds. The MOU specifies the cost sharing for the CE and DEV phases.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603506N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface Ship Torpedo Defense (SSTD)
PROJECT NUMBER: 80225 PROJECT TITLE: Surface Ship Torpedo Defense

J. (U) TEST AND EVALUATION:

1. (U) MOD 7: Since July 1989, 86 in-water test runs have been conducted against modified MK 48 torpedoes simulating These tests have been conducted from various platforms and at various ranges. Additionally, tens of thousands of runs have been performed on the Countermeasures Evaluator (CME) at NAVCOASTSYSCEN to verify design modifications and simulate encounters. During FY 91, pre-production ORDALT kits began delivery, proofing and preparation for TECHEVAL.

2. (U) AN/SLR-24: During Towed array self-noise measurements were conducted aboard the USS JOHN F KENNEDY. Additional at-sea recordings from the USS NIMITZ occurred in to provide detection algorithm development data and false alarm rates.

3. (U) CST EX-1 MK 1 MOD 0: TECHEVAL began in the 2nd Qtr FY 92.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603506N BUDGET ACTIVITY: 4
 PROGRAM ELEMENT TITLE: Surface Ship Torpedo Defense (SSTD)
 PROJECT NUMBER: S2045 PROJECT TITLE: JT US/UK SSTD

POPULAR NAME: US/UK SSTD JOINT PROJECT

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program	RM Labs		MS I	
Milestones	Jun/FY 91		Jun/FY 93	Cont Prog
Engineering				
Milestones				Cont Prog
T&E	Approved		RM Testing Complete	
Milestones	TEMP 3/91		2/93	Cont Prog
Contract		RM Award	DEV Contracts	
Milestones		3/92	7/93	Cont Prog
BUDGET(\$K)	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
Major				
Contract	1.000	12.955	13.050	
Support				
Contract	707	740	885	
In-House				
Support	14.897	12.042	8.896	
GFE/				
Other	100	4.667	2.577	
TOTAL	16.704	30.404	25.408	Cont Prog

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603506N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface Ship Torpedo Defense (SSTD)
PROJECT NUMBER: S2045 PROJECT TITLE: JT US/UK SSTD

B. (U) DESCRIPTION: The US/UK SSTD Joint Project is a collaborative program to design, develop, and produce an anti-torpedo self defense capability for USN and RN combatant, amphibious, and auxiliary surface ships. The program addresses

| The US/UK SSTD system will maximize the use of existing ship equipment and be modular to readily fit the US/UK ship market.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS: ASN (RDA) proposed, and the UK concurred with, a period of Risk Mitigation (RM) studies to include a range of tests and trials undertaken by US and UK Government laboratories with the support of the industrial consortia to demonstrate that the technology is available to meet SSTD requirements before commencing with full D&V.

1. (U) FY 1991 ACCOMPLISHMENTS:
 - a. (U) Completed Concept Evaluation (CE) Phase.
 - b. (U) Completed proposal evaluation.
 - c. (U) Revised system cost estimates.
 - d. (U) Resolved Logistic Review Group (LRG) Findings.
 - e. (U) Began RM effort.
 - f. (U) Initiated expendable feasibility testing.
 - g. (U) Continued risk reduction efforts.
 - h. (U) Approved Test and Evaluation Master Plan (TEMP).
 - i. (U) Continued vulnerability/internal component damage testing.
 - j. (U) Continued cavitation risk reduction testing.
 - k. (U) Initiated signal processing efforts.
 - l. (U) Continued Guidance and Control (G&C) algorithm development.
 - m. (U) Continued Torpedo Classification algorithm effort.
2. (U) FY 1992 PROGRAM:
 - a. (U) Award RM studies contracts to two consortia.
 - b. (U) Continue RM tasks.
 - c. (U) Continue expendable investigations.
 - d. (U) Continue reduction efforts.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603506N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Surface Ship Torpedo Defense (SSTD)
PROJECT NUMBER: S2045 **PROJECT TITLE:** JT US/UK SSTD

- e. (U) Continue vulnerability/internal component damage testing.
- f. (U) Continue cavitation risk reduction.
- g. (U) Continue Torpedo Classification algorithm effort.
- h. (U) Conclude EMD Cost-Share negotiations.
- i. (U) Develop EMD Acquisition Strategy Plan.
- j. (U) Conduct Detection, Classification, and Localization (DCL)

Trials and analysis.

- k. (U) Commence transition of SSTD tasking and personnel pursuant to SECNAV RDT&E consolidation.

3. (U) FY 1993 PLANS:

- a. (U) Complete RM effort.
- b. (U) Conduct System Effectiveness/Trade-Off Studies.
- c. (U) Conduct expendable trials.
- d. (U) Continue Torpedo Classification algorithm effort.
- e. (U) Develop Integrated Program Summary.
- f. (U) Conduct SSTD Design Reviews.
- g. (U) Complete DCL Trials and analysis.
- h. (U) Update Plan of Action and Milestones (POAM), Integrated

Logistic Support Plan (ILSP), Logistic Resource Funding Plan (LRFP), and Life Cycle Cost (LCC) estimate.

- i. (U) Update Threat Definition and Common Performance Requirement (CPR).
- j. (U) Complete UK Equipment Policy Committee (EPC) approval process,

UK Milestone I.

- k. (U) Complete transition of SSTD tasking and personnel pursuant to SECNAV RDT&E consolidation.

- l. (U) Complete US Milestone I approval process.
- m. (U) Commence Demonstration and Validation Phase (DEV).

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE (United States): NAVCOASTSYSCEM, Panama City, FL; NTIC, Wash, DC; NAVOCEANSYSCEM, San Diego, CA; NAVSWC, Silver Spring, MD; NUSC, New London, CT; NUSC, Newport, RI; NAVUSEANARENGSTA, Keyport, WA; TRICCSMA, Newport, RI; NSCSES, Norfolk, VA.
United Kingdom: DRA Portland, Dorset; DRA Portsmouth, Hampshire; Director of Intelligence, London; DGUW(N), Portland, Dorset; DRA Dunfermline, Scotland.
CONTRACTORS: AFL/University of Washington, Seattle, WA; ARL/Pennsylvania State University, State College, PA.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

- 1. (U) Technical changes: Not Applicable.
- 2. (U) Schedule changes: ASN (RDA) proposed alternative approach with early emphasis on Risk Mitigation (RM). A period of RM studies has been inserted, extending the schedule by approximately two years.
- 3. (U) Cost changes: FY 1993 - \$7,785K decrease associated with schedule changes.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603506N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Surface Ship Torpedo Defense (SSTD)
PROJECT NUMBER: S2045 PROJECT TITLE: JT US/UK SSTD

F. (U) PROGRAM DOCUMENTATION:

Memorandum of Understanding (MOU)	10/88
Common Performance Requirement (CPR)	7/90
Joint SSTD System Performance Specification	7/90
Request for Proposal (RFP)	7/90
Test and Evaluation Master Plan (TEMP)	3/91

G. (U) RELATED ACTIVITIES: Not applicable.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: A US/UK SSTD Joint Project Memorandum of Understanding (MOU) was signed on 26 October 1988 by the Under Secretary of Defense (Acquisition) for the US and the Chief of Defense Procurement for the UK. It established the Joint Project Office (SEA 06J). The MOU covers all four project phases (CE, DEV, EMD and Production) as well as other issues such as cost share, exchange rates and industry participation. It requires each country to seek national approvals and to formally declare its intent to continue with the program prior to each phase.

(U) Jointly funded costs will be shared as follows: for CE, the cost of the Joint Project Office (JPO) and its direct support will be shared equally; for DEV, the jointly funded costs will be shared equally; for EMD, the cost of the JPO and its direct support will be shared equally. Cost shares for the EMD contract will be established by the Participants by 4th Qtr FY 1992.

(U) RM/DEV contracts will be awarded to up to two consortia in FY 1992. The consortia selected will then compete for a single EMD contract in FY 1997.

(U) DOD funding profile: NUNN funds FY 1987-FY 1989; RDT&E funding FY 1990 - FY 1997. There are no financial commitments from industry.

J. (U) TEST AND EVALUATION: ASN (RDA) proposed Risk Mitigation (RM) studies including a range of tests and trials undertaken by US and UK government laboratories with the support of the industrial consortia. These tests and trials include detection classification, localization, and vulnerability and will be completed in FY 1993.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603508N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: SHIP PROPULSION SYSTEM
PROJECT NUMBER: S1848 PROJECT TITLE: Gas Turbine Component Improvement Program (GTCIP)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1991 ACTUAL	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1848	GTCIP	800	4,509	4,501	Cont.	Cont.

B. (U) DESCRIPTION: This project demonstrates Component Improvements to maintain availability, operability and reliability, for current and proposed Naval Surface Ships that utilize the existing inventory of gas turbines. This element is not related to Electric Drive or Intercooled Regenerative Gas Turbine. This project continues the Gas Turbine Component Improvement Program efforts in their original separate project line.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- (U) Completed LM2500 fire fighting design efforts.
- (U) Completed demonstration of in-place balancing of LM2500.
- (U) Analyzed AEGIS cruiser turbine blade coating cracks.
- (U) Tested new Allison 501 combustor for K34 applications.
- (U) Completed analysis of problems resulting from low power operation and other operational changes.

2. (U) FY 1992 PROGRAM:

- (U) Complete demonstration of LM2500 fire fighting developments.
- (U) Begin vibration modelling and analysis of Allison 501.
- (U) Complete demonstration on LM2500 turbine liner from low power operation.
- (U) Complete demonstration of 501 combustor.
- (U) Complete TF40B compressor coating development.
- (U) Continue resolution of technical issues resulting from operational changes.

3. (U) FY 1993 PLANS:

- (U) Complete development of LM2500 Main Fuel Control improvements.
- (U) Begin development of improved combustion liner for TF40B engine for reduction of NOX emissions.
- (U) Complete development of Allison 501K vibration modeling.
- (U) Continue in-service evaluation of improved LM2500 Turbine Liner.
- (U) Develop condition based maintenance systems for LM2500, Allison 501K, and TF40B engines.
- (U) Investigate piping and mounting fatigue failures on LM2500.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN HOUSE: NAVSSES, Philadelphia, PA; NSRDC, Carderock and Annapolis, MD. CONTRACTORS: GE, Cincinnati, OH and Daytona, FL; Allison, Indianapolis, IN; Textron Lycoming, Stratford, CT; and Westinghouse MTD, Pittsburgh, PA.

E. (U) RELATED ACTIVITIES: None.

F. (U) OTHER APPROPRIATION FUNDS: None.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603512N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: SHIPBOARD AVIATION SYSTEMS

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W1722	CV Weapons Elevator Improvements	1,016	1,094	1,234	Cont.	Cont.
W1723	CV Launch and Recovery Systems	7,406	14,657	16,845	Cont.	Cont.
	TOTAL	8,422	15,751	18,079	Cont.	Cont.

B. (U) DESCRIPTION: This Navy unique program addresses all technology areas associated with Navy/Marine Corps aircraft operations aboard ships. The program includes: (1) Development of standardized, supportable weapons elevator components; and (2) Development of all systems required to service, support, launch, provide approach and landing control and recover aircraft operating onto or from ships. Payoffs include increased safety, greater sortie generation rates, enhanced aircraft boarding rates, reduced manning, increased aircraft service life and force modernization.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603512N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: SHIPBOARD AVIATION SYSTEMS

PROJECT NUMBER: W1722

PROJECT TITLE: CV WEAPONS ELEVATOR IMPROVEMENTS

C. (U) DESCRIPTION: This project provides for the advanced development, test, evaluation and documentation of standardized elevator components such as control systems, doors and hatches, safety devices, platforms and hoist machinery for aircraft carriers. Emphasis is placed on the improvement of safety, watertight integrity, and weight reduction.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Elevator Ballistic Watertight Door (WTD) - Selected final door design, fabricated and conducted flame and hydro tests.
- b. (U) Elevator Ballistic Watertight Hatch (WTH) - Continued design development.
- c. (U) Hydraulic Fluid Compression Ignition Test Machine (CITM) - Completed detailed design and procured prototype.
- d. (U) Conducted elevator brake (non-asbestos) qualification tests.

2. (U) FY 1992 PROGRAM:

- a. (U) Elevator Ballistic WTD - Conduct shock test and install at Naval Sea Systems Engineering Station (NAVSESSES) land based engineering site (LBES).
- b. (U) Elevator Ballistic WTH - Procure prototype hatch.
- c. (U) Hydraulic Fluid CITM - test prototype.
- d. (U) Non-asbestos brakes - Complete evaluation.
- e. (U) Procure and test wire rope test device.

3. (U) FY 1993 PLAN:

- a. (U) Elevator Ballistic WTD - Conduct operability tests.
- b. (U) Elevator Ballistic WTH - Conduct shock test and install at NAVSESSES.
- c. (U) Initiate shipboard evaluation of wire rope test device.
- d. (U) Design improved undercar mechanical safety subsystem prototype.

4. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVSESSES, Port Hueneme, CA; DTIC, Bethesda, MD
CONTRACTORS: Rosenblatt, Philadelphia, PA; MTD, Philadelphia, PA; Westinghouse, Pittsburgh PA.

F. (U) RELATED ACTIVITIES: N/A

G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: N/A

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603512N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: SHIPBOARD AVIATION SYSTEMS
PROJECT NUMBER: W1723 PROJECT TITLE: CV LAUNCH AND RECOVERY SYSTEMS

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W1723	CV Launch and Recovery Systems	7,406	14,657	16,845	Cont.	Cont.

B. (U) DESCRIPTION: This project addresses (1) modernization of catapults and arresting gear, and (2) advanced development of covert air traffic control approach and landing systems. The first area develops a stand-alone Electromagnetic Aircraft Launch System (EMALS) including associated advanced control and power systems. Also being developed is a control system for arresting gear to replace antiquated, manpower intensive systems of the 1950's. The second area develops advanced electronic and optical tracking, approach, landing and guidance systems for covert, all-weather operations on ships. Improved optical landing systems will provide active and passive displays so that the pilot and the Landing Signal Officer (LSO) can take corrective action to prevent accidents and increase boarding rates. The Signature Managed Air Traffic Control, Approach and Landing Systems (SMATCALS) will allow around-the-clock, all-weather operations from ships during radio frequency emission control conditions.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:
 - a. (U) Completed EMALS Advanced Development Model (ADM) preliminary design studies.
 - b. (U) Issued Request for Proposals for SMATCALS ADM.
 - c. (U) Continued development of Advanced Recovery Control System (ARCS), Improved Carrier Optical Landing System (ICOLS) Long Range Linear System (LRLS), and Close-in Approach Indicator (CAI) MOD 2 Advanced Development Models (ADM).
2. (U) FY 1992 PROGRAM:
 - a. (U) Initiate demonstration of critical EMALS components.
 - b. (U) Award SMATCALS ADM contract(s).
 - c. (U) Start Demonstration/Validation (DEMVAL) of CAI MOD 2 ADM.
 - d. (U) Complete DEMVAL(s) of ARCS and ICOLS/LRLS ADM(s).

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603512N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: SHIPBOARD AVIATION SYSTEMS
PROJECT NUMBER: W1723 PROJECT TITLE: CV LAUNCH AND RECOVERY SYSTEMS

3. (U) FY 1993 PLANS:

- a. (U) Demonstrate several of the critical EMALS components.
- b. (U) Initiate fabrication of SMATCALS ADM(s).
- c. (U) Complete DEMVAL of CAI MOD 2 ADM.
- d. (U) Initiate development of ICOLS Long Range Glidescope System (LRGS) ADM.

4. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAEC, Lakehurst, NJ; NOSC, San Diego, CA; NAC, Indianapolis, IN; NRL, Washington, D.C.; NATC, Patuxent River, MD; NESEA, St. Inigoes, MD. CONTRACTORS: Teledyne Defense Systems, Springfield, MA; Boeing, Seattle, WA; Hazeltine Corp, Greenlawn, NY.; Kaman Aerospace, Bloomfield, CT; PSM, Pittsburgh, PA; General Atomics, San Diego, CA; E-Systems Salt Lake City, Utah; Unisys, Great Neck, NY.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: N/A

2. (U) SCHEDULE CHANGES:

- a. (U) ARCS: MS II accelerated 12 months through simplification of interfacing requirements of system components.
- b. (U) EMALS: Contract award for critical components development delayed 6 months because of contractor requests for extensions of preliminary design contract completion.
- c. (U) SMATCALS: MS II delayed 12 months to allow the DEMVAL phase to be extended to include at-sea evaluations on both a carrier and an amphibious assault ship.
- d. (U) ICOLS/LRLS: MS II accelerated 15 months through simplification of design and stabilization processes.
- e. (U) LSO HUD: Program cancelled.

3. (U) COST CHANGES: FY 1993: +\$1,750K related to pricing adjustments primarily for DEOP.

F. (U) PROGRAM DOCUMENTATION:

ARCS -- Operational Requirement (OR) #122-05-88 19 September 86
EMALS -- Tentative Operational Requirement 09 October 87; DOP 01 May 89;
Acquisition Plan 28 September 89
SMATCALS -- OR #162-05-90 03 June 87
ICOLS -- OR #195-05-88 28 December 87
CAI MOD 2 -- OR #172-05-88 06 August 87

G. (U) RELATED ACTIVITIES: NONE

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603512N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: SHIPBOARD AVIATION SYSTEMS
PROJECT NUMBER: W1723 PROJECT TITLE: CV LAUNCH AND RECOVERY SYSTEMS

H. (U) OTHER APPROPRIATION FUNDS: N/A

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: N/A

J. (U) MILESTONE SCHEDULE:

<u>Subproject</u>	<u>AP</u> <u>Add</u>	<u>TEMP</u> <u>Add</u>	<u>CONTRACT</u> <u>Award</u>	<u>DEMVAL</u> <u>Start</u>	<u>MS-II</u>
ARCS	N/A	03/92	N/A	06/92	09/92
EMALS	09/89	06/92	09/92	03/97	06/98
SNATCALS	04/91	06/92	06/92	12/94	06/96
ICOLS/LRLS	03/92	03/92	03/92	06/92	09/92
ICOLS/LRGS	03/93	03/93	03/94	06/94	09/94
CAI MOD 2	N/A	N/A	N/A	06/92	09/94

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603513N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: SHIPBOARD SYSTEMS COMPONENT DEVELOPMENT

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0382 Shipboard Auxiliary Systems Development	10,660	23,900	28,036	CONT.	CONT.
S1712 Hull, Mech. & Elec. Improvement	0	3,944	3,807	CONT.	CONT.
TOTAL	10,660	27,844	31,843	CONT.	CONT.

B. (U) DESCRIPTION: This program develops affordable non-propulsion machinery systems, components and improvements for current and future surface fleet Hull, Mechanical and Electrical (HM&E) systems. It includes auxiliary machinery, hull and deck machinery, fiber optic systems, shipboard corrosion control, HM&E materials, underway replenishment and ship salvage systems. Fiber Optics development includes the fiber optic data multiplexing system (FODMS), and the fiber optic integrated voice communications system (FOIVCS). All systems are engineered under the integrated interior communication and control (IC²) total shipwide network engineering program. The program develops shipboard cable topology, analog and digital optoelectronic interfaces, passive optical sensors, high speed optical network (HSON) concept. Local Area Networks (LAN) such as the CVN73 LAN are also developed and prototyped.

(U) Program is closely coordinated with Advanced Ship Machinery System (ASMS) formerly IED, to avoid redundant efforts. The program is independent of ASMS and does not duplicate any efforts.

(U) System developments in the Shipboard Auxiliary Development project (S0382) are usually ACAT IVT or IVM, and the HM&E Improvement project (S1712) is Non-ACAT resulting primarily in new specifications, standards and operating procedures. The program uses technology from industry/Navy exploratory development programs, evaluates breadboard units in the laboratory, and develops prototype equipment for technical and operational evaluation in Navy platforms and facilities. Thrusts are directed towards improved affordability, performance, reduced life cycle cost, produceability, service life, reliability and maintainability, signature reduction, safety, commonality, standardization, weight, volume, and manning. Systems generally apply to all ships, and many components may be backfitted or implemented relatively late in a new ship design cycle. This program presents many windows of opportunity to transition technology to the current and future fleet.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603513N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: SHIPBOARD SYSTEMS COMPONENT DEVELOPMENT
PROJECT NUMBER: S0382 PROJECT TITLE: SHIPBOARD AUXILIARY SYSTEMS DEVELOPMENT

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0382 Shipboard Auxiliary Systems Development	10,660	23,900	28,036	CONT.	CONT.

B. (U) DESCRIPTION: Develops shipboard auxiliary components and systems to improve performance, reliability, affordability, and maintainability that result in size, weight and/or life cycle savings.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Resumed development of advanced hull, mechanical, and electrical (EM&E) systems and components; EM&E materials and corrosion control, shipboard salvage, and underway replenishment technology.
- b. (U) Began LABEVAL of prototype electrolytic disinfectant generator (EDG), completed SHIPEVAL nitrogen generator, prepared variable capacity centrifugal pump (VCCP) for LABEVAL; Obtained Milestone IIIA approval for RO desalination unit, prepared contract package for reverse osmosis unit, E134 refrigerant, composite pump family. Initiated advanced degaussing system technologies. Fabricated and assembled non-ozone depleting CFC gas test loop.
- c. (U) Successfully conducted (IC) Proof of Concept engineering validation integrating four diverse fiber optic network systems. Completed Phase I of the FODMS design package. Fabricated prototype interface unit. Completed development of CVN-73 Admin LAN System design. Completed high speed optical network (HSON) hardware designs, computer interfaces, and delivered basic switching systems.

2. (U) FY 1992 PROGRAM:

- a. (U) Complete LABEVAL prototype EDG award contract TECHEVAL units. Award contract for MIL-SPEC shipboard RO unit and complete MS IIIB qualification tests. Complete TECHEVAL gaseous N2 generator obtain MS III approval. Award contract for standard family centrifugal pumps design. Complete LABEVAL VCCP install for SHIPEVAL. LABEVAL HPAC air ends and system concepts.
- b. (U) Complete evaluation Super Soft Ultrasonic Test (UT) system. Continue Impressed Current Cathodic Protection (ICCP) studies. Initiate development of underwater paint system, underwater welding development, spring tow hawser and buoyant lift system.
- c. (U) Continue development of the integrated interior communication and control total shipwide network engineering effort, fiber optics data multiplexing system, fiber optic integrated voice communications system, high speed optical network concept, and complete development of CVN-73 Local Area Network. Begin development of the analog and digital optoelectronic interfaces, and passive optical sensors.
- d. (U) Continue development of advanced EM&E systems and components, EM&E materials, coatings and corrosion control and ship salvage technology.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603513N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: SHIPBOARD SYSTEMS COMPONENT DEVELOPMENT

PROJECT NUMBER: 80382 PROJECT TITLE: SHIPBOARD AUXILIARY SYSTEMS DEVELOPMENT

3. (U) FY 1993 PLANS:

a. (U) Continue development of advanced HM&E systems and components and materials, underway replenishment, hull and deck and shipboard salvage systems and plans. SHIPEVAL EDG, LABEVAL standard family pumps, complete SHIPEVAL VCCP. Develop modern Prairie Marker and surface ship air systems. Conduct environmental evaluation of underwater paint systems. Complete spring tow hawser system, and buoyant lift system.

b. (U) Continue material technology development of coatings, engineering systems, thermal sprays for machinery restoration, and ship corrosion protection. Continue ICCP model development and studies.

c. (U) Continue development of (IC) systems including distributed combat systems, HM&E data network, logistics and administrative network, fiber optics data multiplexing system, fiber optics integrated voice network, high speed optical network concept, passive optical sensors, and analog and digital optoelectronic interfaces. Initiate final stages of topology design and complete development of the high speed optical network concept.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: DTRC, Annapolis, MD; NAVSSES, Philadelphia, PA; NESEC, Vallejo, CA; NIST, Boulder, CO; NOSC, San Diego, CA; NRL, Washington, DC; NSWC, Dahlgren, VA; NWS, Yorktown, VA; NWSC, Crane, IN. CONTRACTOR: American Systems Corporation, Arlington, VA; Gibbs & Cox, Inc., Arlington, VA; Planning Research Corporation, Reston, VA; Rockwell International, Anaheim, CA; Dresser-Rand, Painted Post, NY; Westinghouse MTD, Pittsburg, PA; Geo-Centers, Ft. Washington, MD; M. Rosenblatt & Sons, Arlington, VA; Labarge Electronics, Tulsa, OK; Rix Industries, San Francisco, CA; ElTech, Cleveland, OH; Mantech, Arlington, VA; Village Marine, Gardina, CA; Ingersoll Rand, Allentown, PA; Aurora Technology, East Aurora, NY; Hydropac, Erie, PA; Brunswick Corp., Lincoln, NE; Fibertek, Springville, UT; HLA Engineering, Dallas, TX; Specialty Plastics, Baton Rouge, LA.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: None.

2. (U) SCHEDULE CHANGES: None.

3. (U) COST CHANGES: None.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603513M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: SHIPBOARD SYSTEMS COMPONENT DEVELOPMENT
PROJECT NUMBER: 80382 PROJECT TITLE: SHIPBOARD AUXILIARY SYSTEMS DEVELOPMENT

F. (U) PROGRAM DOCUMENTATION:

OR	285-03-92 of 18 Jun 91	Electrolytic Disinfectant Generator
OR	80382 of 5 Sep 89	Gaseous Nitrogen Generator
OR	80382-31 of 22 Sep 88	400 Hz Current Limiting Device
NAPDD	80382-27 of 10 Nov 86	Shpbd Elec Sys Group Fault Locator
NAPDD	80382-18 of 23 Jun 86	Shipboard Corrosion Control
TEMP	485-3 of 4 Nov 85	Variable Capacity Centrifugal Fire Pump
TEMP	718-1 of 5 Nov 85	H.P. Single Screw Air Compressor
TEMP	485-01 of 14 Nov 85	Std Family Positive Displacement Pumps
TEMP	106-5 of 13 Jun 86	Standard Family of Composite Pumps
TEMP	1156-01 of 7 Oct 88	Shipboard Salvage
OR	277-03-91 of 21 Jan 91	(FOOMS1)
OR	289-03-91 of 06 Aug 91	(FOOMS2)
OR	288-03-91 of 09 Aug 91	Fiber Optic IVCS
NAPDD	241-03 of 04 Jun 90	Shipboard Fiber Optics Top. Dev.
NAPDD	254-03 of 13 Feb 91	Fiber Optic Sensor Stds/Spec
NAPDD	255-03 of 29 Mar 91	(IC)

G. (U) RELATED ACTIVITIES:

- Program Element 0602121N, Surface Ship Technology
- Program Element 0603721N, Environmental Protection - Heating Ventilation and Air Conditioning (HVAC) system efforts to develop non-ozone depleting refrigerants transitioned to Program Element 0603721N in FY-1992.
- Program Element 0603573N, IED - Closely coordinated to avoid redundant efforts for new systems and architectures.

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE: Category III (AFP) milestones for the following programs are as follows:

Reverse Osmosis Desalinator	91/3Q
EDG	94/2Q
VCCP Fire Pump	94/2Q
High Pressure Single Screw Compressor	97/2Q
Standard Positive Displacement Pump	96/2Q
Standard Family of Composite Pumps	95/3Q
Shipboard Salvage Systems	Various
Gaseous Nitrogen Generator	92/4Q
400 Hz Current Limiter	TBD
Shipboard Corrosion Control	Various
Fiber Optic Data Multiplexing System (1)	94/4Q
Fiber Optic Data Multiplexing System (2)	96/3Q
Fiber Optics IVCS	94/4Q
(IC) (NAPDD)	97/3Q
Shipboard Fiber Optics Topology (NAPDD)	95/4Q
Fiber Optic Sensor Stds/Spec (NAPDD)	97/2Q
High Speed Optical Network Concept (NAPDD)	93/4Q

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603513N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: SHIPBOARD SYSTEMS COMPONENT DEVELOPMENT

PROJECT NO.: S1712 PROJECT TITLE: HULL MECH & ELEC IMPROVEMENT

C. (U) DESCRIPTION: This project develops improved equipments which are small but critical components of hull, mechanical and electrical systems with the emphasis on short-term developments for immediate fleet applications.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Not applicable.

2. (U) FY 1992 PROGRAM:

a. (U) Resume/continue development of HP and LP air dehydrators, HVAC and electrical equipments composite piping, ducting and components, electrical ship control equipment, Fueling-at-Sea hose/ winches, advanced sea and fresh water components, UNREP equipment, material handling equipment, and hull and deck machinery.

b. (U) Begin development of advanced degaussing system, magnetic model for steel hulled combatants and magnetic signature control techniques for mine sweeps. LABEVAL HP dehydrator, develop shock design manual for composite piping valves, and SHIPEVAL composite shaft on a Minesweeper Boat (MSB). Initiate architecture concept designs for distributed auxiliaries and in particular the evaluation of distributed firemain system. Conduct logistics analyses for standard positive displacement pumps family. Obtain safety approval for maintenance free batteries, conduct power quality analysis to support Oceanographic ship (TAG), ship test ground fault locator and LABEVAL permanent magnet (PM) hydraulic motor. Develop fuel cell and condition based maintenance technology. Initiate Navy standard transmission control and rudder roll stabilization design, fabricate constant tension winch.

3. (U) FY 1993 PLANS: Continue development of architectures, air system components, composite components and equipment, electrical control equipment, magnetic silencing models and procedures, FAS hose/winches, advanced sea and fresh water, ventilation, UNREP, material handling equipment, hull and deck machinery, and advanced EM&E components to meet near term fleet needs.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: DTRC, Bethesda, MD; NAVSSES, Philadelphia, PA; NSWC, Crane, IN; NSWSES, Port Hueneme, CA; NCSC, Panama City, FL; CONTRACTORS: Bend Research, Bend, OR; Sepeda Associates, Louisville, KY; NKF Associates, Arlington, VA; Aeroquip, Jackson, MI; Smith Fiberglass, Little Rock, AR; Gibbs & Cox, Arlington, VA.

F. (U) RELATED ACTIVITIES: Program Element 0602121N (Surface Ship Technology).

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603514N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Ship Combat Survivability

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1991 ACTUAL	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0384	Ship Survivability (Advanced)	16,534	10,872	8,633	Cont.	Cont.
S1121	Personnel Protection	3,652	4,190	3,802	Cont.	Cont.
S1565	Ship Damage Control	8,046	7,147	7,699	Cont.	Cont.
S2053	CBR Defense	1,446	3,225	3,542	Cont.	Cont.
TOTAL		29,678	25,434	23,676	Cont.	Cont.

B. (U) DESCRIPTION: The advanced development of equipment/systems/engineering data and full scale weapons effects simulation will provide protection of ships and their personnel from conventional, nuclear, chemical, and biological weapon effects, and enable the ship to continue performing assigned missions at an effective level. This program is also concerned with the effects of fire, smoke, and lethal environments created by peacetime accidents and the development of fire protection and damage control capabilities necessary to limit, control, and correct wartime and peacetime casualty situations.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603514N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Ship Combat Survivability

PROJECT NUMBER: 80384

PROJECT TITLE: Ship Survivability (Advanced)

C. (U) DESCRIPTION: This project undertakes development of protection concepts and specifications to meet the objectives of OPNAVINST 9070.1. Specifically, that combatants be able to deal with the degrading effects of damage from missiles, torpedoes and mines, and be capable of performing critical missions in a nuclear conflict.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:

a. (U) (1) Completed fabrication of

b. (U) Completed towing tank stability studies on "battle-damaged" DD 963; initiated DDG-51 (Flight I) model tests.

c. (U) Completed Electromagnetic Pulse (EMP) post-Precursor ship trial evaluations; developed ordnance EMP test procedures.

2. (U) FY 1992 Program:

a. (U)

b. (U) Complete towing tank stability studies on "battle-damaged" DDG-51 (Flights I and II); complete assessment of stability characteristics.

c. (U) Complete development of composite structures technology.

d. (U) Develop underwater explosion (UNDEX) whipping resistant hull girder designs for DDG-51 (Flight II); initiate development of future combatant design options.

e. (U) Prepare for full threat EMP trial of CG-68.

f. (U) Conduct final tests of icephobic paint; develop specification.

g. (U) Initiate development of lightweight low-intensity-conflict

(LIC) armor concepts; conduct full scale tests.

3. (U) FY 1993 Plans:

a. (U)

b. (U) Continue development of UNDEX resistant future surface combatant design options; conduct scaled model tests.

c. (U) Continue full scale testing of LIC armor systems; conduct shipboard certification tests.

d. (U) Conduct full threat EMP trial of CG-68.

4. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NSWC, Carderock Division, Bethesda, MD; NSWC, Dahlgren Division, Dahlgren, VA; U.S. Army Combat Systems Test Activity, Aberdeen Proving Grounds, Aberdeen, MD; CONTRACTORS: CASDE Corp., Arlington, VA.

F. (U) RELATED ACTIVITIES: Program Element 0604516N (Ship Survivability)

G. (U) OTHER APPROPRIATION FUNDS: Specification changes included in new construction ships (SCN funding).

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603514N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Ship Combat Survivability

PROJECT NUMBER: S1121

PROJECT TITLE: Personnel Protection

C. (U) DESCRIPTION: Provides for design/development of shipboard personnel protective clothing and equipment to protect ship's complement from the effects of hostile actions and peacetime accidents.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:

a. (U) Reached Milestone III on Naval Flak Vest.

b. (U) Outfitted selected ships with Interim Non-Developmental Item (NDI) Laser protective spectacles.

2. (U) FY 1992 Program:

a. (U) Begin production of Naval Flak Vests and Naval Battle Helmets.

b. (U) Reach Milestone II on Firefighter's Breathing Apparatus (FFBA).

3. (U) FY 1993 Plans:

a. (U) Conduct FFBA TECHEVAL.

b. (U) Begin full scale development of laser eye protection and testing of Special Application Firefighters (FF) Helmet with integral thermal imager.

c. (U) Conduct FFBA OPEVAL and obtain Milestone III decision.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, DC; Naval Clothing and Textile Research Facility, Natick, MA; NCSC, Panama City, FL; NAVSSES, Philadelphia, PA; NAMRL, Pensacola, FL. CONTRACTORS: G. Sharpe, Inc., Arlington, VA; American Systems Engineering Corp., Arlington, VA; Weidlinger Associates, New York, NY and Arlington, VA; JJH, Inc., Arlington, VA.

F. (U) RELATED ACTIVITIES: Not Applicable.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

P-1 LI #245	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN COSAL Outfitting:	500	1,734	16,148	Cont.	Cont.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603514N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Ship Combat Survivability

PROJECT NUMBER: S1565

PROJECT TITLE: Ship Damage Control

C. (U) DESCRIPTION: This project provides advanced development of improved damage control and firefighting equipment, devices, and systems for rapid damage control and recovery for mission retention in a post hit situation.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:

- a. (U) Completed Advanced Development planning for the Integrated Survivability Management System (ISMS), and installation of Flooding Casualty Control System (FCCS) on selected FFG-7 class ships.
- b. (U) Completed qualification testing of Lightweight Fire Insulation.
- c. (U) Completed full scale fire tests of weapons induced shipboard fires of conflagration size, and pre-trial test planning on joint Italian/United States weapons tests on ex-MARGOTTINI.

2. (U) FY 1992 Program:

- a. (U) Complete DEM/VAL Tests of the Damage Control Hull Communications System; transition to ISMS.
- b. (U) Complete instrumenting ex-MARGOTTINI in preparation for liquid missile propellant/shaped charge weapons tests.
- c. (U) Complete revisions to cable specifications to incorporate new fire test methods and improved material fire tolerance; initiate analysis and testing of industry developed metal-sheathed ("no fuel load ") cables.
- d. (U) Complete ISMS advanced development model for FY93 ship installation, and fleet operational assessment of FCCS.
- e. (U) Complete assessment of superconcentrated Aqueous Film Forming Foam (AFFF), and doctrine and procedures for fighting weapons-induced conflagration-size shipboard fires.
- f. (U) Initiate evaluation of fiber optic damage control sensors addressing temperature, smoke, flame, and flooding.
- g. (U) Initiate ship compartment fire tests on ex-USS SHADWELL to develop correlation data with small scale tests for shipboard materials.

3. (U) FY 1993 Plans:

- a. (U) Conduct at-sea evaluation of ISMS prototype hardware/software.
- b. (U) Complete weapons tests on ex-MARGOTTINI, with Proj S0384.
- c. (U) Develop procurement specification for metal-sheathed cables.
- d. (U) Procure, install, and conduct shipboard evaluations of fiber optic damage control sensors.

4. (U) Program To Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Wash., DC; DTRC, Carderock/Annapolis, MD; NSWC, Dahlgren, VA; NOSC, San Diego, CA; NAVSSES, Philadelphia, PA; NWC, China Lake, CA. CONTRACTORS: Hughes Associates, Inc., Wheaton, MD; SRI International, Menlo Park, CA; J.J. McKullen Associates, Inc., NY, NY; Westinghouse MTD, Pittsburg, PA; Weidlinger, Arlington, VA.

F. (U) RELATED ACTIVITIES: P.E. 0604516N Ship Survivability - Proj S2054 (Ship Damage Control) P.E. 0603514 Ship Combat Survivability - Proj S0384 (Ship Survivability (Adv))

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Ship design data is exchanged with Italy under MWDDRA-N-85-I-417.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603514N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Ship Combat Survivability

PROJECT NUMBER: S2053

PROJECT TITLE: CBR Defense

C. (U) DESCRIPTION: Advanced development of chemical, biological and radiological (CBR) defensive systems required to counter new and novel threats in the early 2000 time frame.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:

- a. (U) Completed design studies/tests of vapor microsensor, and Shipboard Automatic Liquid Agent Detector (SALAD) systems.
- b. (U) Completed studies/testing of materials for advanced protective clothing.
- c. (U) Initiated studies and tests of Biological Agent Detection Systems (BADS) components.
- d. (U) Evaluated advanced filtration/air purification systems and collected ambient environmental samples of air contaminants.

2. (U) FY 1992 Program:

- a. (U) Complete prototype design/testing of shipboard advanced filtration/air purification systems.
- b. (U) Continue threat challenge studies.
- c. (U) Continue studies/testing of BADS.
- d. (U) Complete cost and operational effectiveness analysis of SALAD.
- e. (U) Initiate shipboard evaluation of an Individual Chemical Agent Detector (ICAD), an Non-Developmental Initiative (NDI)

candidate.

- f. (U) Continue evaluating inherent contamination effects on CBR filter performance.

3. (U) FY 1993 Plans:

- a. (U) Continue evaluating advanced filtration/air purification systems.
- b. (U) Continue threat challenge work, ICAD and CBR filter performance evaluations.
- c. (U) Continue advanced development of BADS.
- d. (U) Complete DEM/VAL of SALAD.
- e. (U) Initiate DEM/VAL of a Chemical Agent Remote Detection System (CARDS).

4. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, DC; NWSC, Crane, IN; NAVSWC, Dahlgren, VA; DTRC, Annapolis, MD. CONTRACTORS: Solar Turbine, San Diego, CA; Battelle, Columbus, OH; Brunswick Corp., Clearwater, FL.

F. (U) RELATED ACTIVITIES: Program Element 0604506N CW Countermeasures; Program Element 0602233N Mission Support Technology

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603522N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Submarine Arctic Warfare Support Equipment Program
PROJECT NUMBER: F0770 PROJECT TITLE: Advanced Submarine Support
Equipment Program (ASSEP)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1991 ACTUAL	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE CONT.	TOTAL PROGRAM CONT.
F0770	ASSEP	2,836	2,128	4,153		

B. (U) DESCRIPTION: This program develops submarine Electronic Support Measures (ESM) technology to increase submarine operational effectiveness in the increasingly dense and sophisticated electromagnetic environment caused by the proliferation of complex communications, navigation, and radar equipment in use by potential adversaries. Improved threat warning, over-the-horizon targeting support for submarine-launched cruise missiles, and expanded tactical reconnaissance are addressed. Specific efforts include advanced development for: the Integrated ESM Mast (IEM), the Advanced Submarine Tactical ESM Combat System (ASTECS), Radar Cross Section Reduction techniques, and periscope monopulse direction finding (DF). The ASTECS Program is a new start (ORD approved October 1991) that will provide the next generation ESM system for attack submarines. ASTECS is being developed to meet the enhanced threat signal environment and the space limitations expected in the new attack submarine.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- (U) Completed testing IEM antenna Feasibility Development Model.
- (U) Investigated monopulse DF designs that use a compact periscope-mounted antenna.
- (U) Investigated Radar Cross Section Reduction (RCSR) techniques and materials.

2. (U) FY 1992 PROGRAM:

- (U) Begin Concept Exploration and Definition for ASTECS. Efforts to include development of an interface with the IEM; plus advanced development of components and sensors for detecting, classifying, and locating: electro-optic and low-probability-of-intercept radar and communications signals.
- (U) Contract for monopulse DF Feasibility Development Model.
- (U) Continue RCSR techniques and materials investigation.

3. (U) FY 1993 PLANS:

- (U) Begin Demonstration and Validation for ASTECS.
- (U) Continue development of monopulse DF Feasibility Model.
- (U) Continue RCSR techniques and materials investigation.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NUSC, New London, CT. CONTRACTORS: Raytheon, Goleta, CA; Lockheed Sanders, Nashua, NH; Radant, Stow, MA.; GEC-Marconi, San Diego, CA; ASTECS-TED. 1C1

E. (U) RELATED ACTIVITIES: Program Element 0604515N, Submarine Support Equipment Program, continues ASSEP projects through the Engineering and Manufacturing Development Phase.

F. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603528N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Non-Acoustic Anti-Submarine Warfare (ASW)
PROJECT NUMBER: X0967 PROJECT TITLE: Non-Acoustic Anti-Submarine Warfare (NAASW)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X0967	Non-Acoustics ASW	15,973	0	12,983	Cont.	Cont.

B. (U) DESCRIPTION: The purpose of this program is to ensure that NAASW concepts are properly evaluated and exploited. The current scaled-down program focuses on those technologies which can be developed in the near term and promise to be effective against the slow moving, very quiet submerged diesel submarine or the quiet nuclear submarine. Two specific thrust areas are planned in NAASW. The first is a submarine hull detection system which is effective against the shallow target. The second thrust area is a

technologies to detect the exposed periscope or mast.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:
 - a. (U) Conducted the sensor system Test. (STSS)
 - b. (U) Conducted joint US/UK co-sponsored (OSD Lead) west coast of Scotland test.
 - c. (U) Completed Critical Design Review for ATD-111, the submarine detection system.
 - d. (U) Completed engineering design for ATD-111 and system assembly commenced.
2. (U) FY 1992 PROGRAM: Not Applicable. Program is funded within the R&D Defense Agency account.
3. (U) FY 1993 PLANS:
 - a. (U) Conduct initial field test of the ASW detection system.
 - b. (U) Continue the engineering development for the and improved for retrofit into ATD-111.
 - c. (U) Conduct trade-off studies on periscope detection systems.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603528N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Non-Acoustic Anti-Submarine Warfare (ASW)

PROJECT NUMBER: X0967

PROJECT TITLE: Non-Acoustic Anti-Submarine Warfare (NAASW)

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORKED PERFORMED BY: IN-HOUSE: NRL, Washington, DC; NADC, Warminster, PA; NRL, Stennis Space Center, MS; NOSC, San Diego, CA; NCSC, Panama City, FL. CONTRACTORS: Applied Physics Laboratory/Johns Hopkins University, Laurel, MD; Lockheed Sanders Inc., Nashua, NH; ARETE Associates, Sherman Oaks, CA; Lawrence Livermore National Laboratory, Livermore, CA.

E. (U) COMPARISON WITH REVISED FY 1992/93 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not Applicable.

2. (U) SCHEDULE CHANGES: Not Applicable.

3. (U) COST CHANGES: Decrease of \$45,934 reflects a transfer of funding to PE 0603714D, program restructure, and various pricing adjustments.

F. (U) PROGRAM DOCUMENTATION:

a. (U) Non-Acquisition Program Definition Document #033-02 (REV 1) dated 05 November 1991.

b. (U) Tentative Operational Requirements for LAMPS SH-2F/G and SH-60B Light Detection and Ranging (LIDAR) dated 14 September 1990.

G. (U) RELATED ACTIVITIES: ...

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONES SCHEDULE:

- a. (U) Critical Design Review, ATD-111
- b. (U) Initial ATD-111
- c. (U) Commence periscope detection trade studies
- d. (U) AIREM/SHAREM Project ATD-111 test
- e. (U) Integrate Project ATD-111 Upgrades
- f. (U) Project ATD-111 Upgrades AUTEC test
- g. (U) Project ATD-111 Engineering and Field Test in support of NAVAIR transition
- h. (U) Award Periscope Detection System contract

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603529N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Advanced Antisubmarine Warfare Target

PROJECT NUMBER: F0968 PROJECT TITLE: MK-30 Target Development



POPULAR NAME: Mk 30 ASW Mobile Target

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	TO COMPLETE
PROGRAM MILESTONES			Mk 30 Mod 2 MS II - Apr 93	Mk 30 Mod 2 MS III - 1Q97 IOC - 3Q98
ENGINEERING MILESTONES		Mk 30 Mod 2 SRR - Jun 92	Mk 30 Mod 2 CDR - Aug 93	
T&E MILESTONES			FDT testing completes - Aug 93	Mk 30 Mod 2 DT II - 2Q96 OT II - 3Q96
CONTRACT MILESTONES		Mk 30 Mod 2 Design contracts award - Aug 92	Mk 30 Mod 2 Prototype Fabrication contract - Aug 93	
BUDGET (\$K)	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
MAJOR CONTRACT	2,686	8,615	12,556	Continuing
SUPPORT CONTRACT	400	400	400	Continuing
IN-HOUSE SUPPORT	1,278	5,777	1,793	Continuing
GFE/OTHER	520	2,040	1,750	Continuing
TOTAL	4,884	16,832	16,499	Continuing

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603529N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Advanced Antisubmarine Warfare Target

PROJECT NUMBER: F0968 PROJECT TITLE: MK-30 Target Development

B. (U) DESCRIPTION: This program develops ASW target capabilities for test and evaluation of ASW weapons/sensors and for fleet ASW training. There are two major efforts, the Fast Deep Target (FDT) and an upgrade to the current in-service Mk 30 Mod 1 Fleet ASW Target, the Mk 30 Mod 2. The Fast Deep Target is a non-acquisition category, special-purpose target being developed to establish a capability for test and evaluation of the Mk 48 ADCAP and Mk 50 Torpedoes at maximum threat speed and depth. Due to Congressional direction, the Fast Deep Target program has received the higher fiscal priority and the Mk 30 Mod 2 development was deferred. The Fast Deep Target is a 21-inch, 30-foot-long, torpedo-shaped, self-propelled vehicle capable of speeds to _____ and operating depths of _____ with a maximum endurance of 30 minutes. It is propelled by an Advanced Stored Chemical Energy Propulsion System (ADSCEPS). The electro-acoustic system is made up of off-the-shelf hardware that has been modified for fast/deep operations. With completion of the Fast Deep Target, the Mk 30 Mod 2 will be reemphasized. The Mk 30 Mod 2 is a 21-inch, 20-foot-long, self-propelled vehicle with a maximum endurance of 6 hours and has a variable speed capability from 7 to 30 knots. The Mk 30 Mod 2 effort develops upgrades to the Mk 30 Mod 1 for increased acoustic realism, increased target reliability and availability to the Fleet and updates the target's electro-acoustic capabilities to simulate the threat and for compatibility with the Navy's ASW sensors/weapons.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Integrated Fast Deep Target payload and propulsion systems.
- b. (U) Commenced Fast Deep Target in water testing. Vehicle control problem encountered.

2. (U) FY 1992 PROGRAM:

- a. (U) Modification of Fast Deep Target guidance and control subsystem complete.
- b. (U) Conduct Fast Deep Target demonstration and validation testing.
- c. (U) Reinitiate Mk 30 Mod 2 development.
- d. (U) Conduct Mk 30 Mod 2 requirements update.
- e. (U) Conduct Mk 30 Mod 2 system level design analysis.

3. (U) FY 1993 PLANS:

- a. (U) Complete Fast Deep Target demonstration and validation testing.
- b. (U) Complete Mk 30 Mod 2 Milestone II decision 3QFY93.
- c. (U) Competitively award Mk 30 Mod 2 prototype fabrication contract.
- d. (U) Fast Deep Target support available for Mk 48 ADCAP and Mk 50 torpedo testing and evaluation.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

BUDGET ACTIVITY: 4

PROJECT NUMBER: F0968 PROJECT TITLE: MK-30 Target Development

D. (U) WORK PERFORMED BY: IN-HOUSE: NUSC, Newport, RI; NAVUSEAWARENGSTA, Keyport, WA. CONTRACTORS: Loral Systems Group, Akron, OH; Raytheon, Portsmouth, RI; Applied Research Laboratory/Pennsylvania State University, State College, PA.

2. (U) Schedule Changes: Delay of Fast Deep Target availability for Mk 48 ADCAP and Mk 50 torpedo testing from FY 1992 to FY 1993 due to technical problems.

F. (U) PROGRAM DOCUMENTATION:

Mk 30 Mod 2: NDCP - 7/80

TEMP - 9/85

• Program Element 0603691N, Mk 48 Advanced Capability Engineering is supported by the Fast Deep Target for test and evaluation of critical operational testing objectives.

* Program Element 0604610N, Advanced Lightweight Torpedo (ENG) is supported by the Fast Deep Target for test and evaluation of critical operational testing objectives.

• Program Element 0602314N, Advanced Torpedo Technology Thrust develops Advanced Stored Chemical Energy Propulsion System (ADSCEPS) technology used by the Fast Deep Target.

H. (U) OTHER APPROPRIATION FUNDS: None.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION:

1. Demonstrated FDT maximum speed capability, FY 1991.

2. Demonstrate FDT acoustic compatibility with torpedoes, FY 1992.

3. Demonstrate FDT maximum depth capability, FY 1993.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603542N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Radiological Controls

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1991 ACTUAL	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1825	Radiological Controls	205	192	222	CONT.	CONT.
S1830	RADIAC Development	3,819	2,665	3,573	CONT.	CONT.
	TOTAL	4,024	2,857	3,795	CONT.	CONT.

B. (U) DESCRIPTION: Project S1825 supports two major Navy-wide radiation protection efforts. The first is development of a computer modeling program for estimating potential radiation exposures in and around shipboard nuclear weapons (and shore storage) suitable for personal computers. The program Mathematical Radiation Environment Model for Ships (MREMS) utilizes all known radiation parameters particular to a weapons system as well as composition and arrangement of intervening structures. MREMS has a significantly more important role today as a valid means for estimating potential radiation exposures received from weapons systems in radiation injury claims. MREMS has applicability for use by other military services. This project also concerns refinement of neutron measurement from weapons and other industrial sources involving scientific laboratory/field testing. The importance of this effort is that the relative risk from neutron exposure is still a question of concern and uncertainty within the scientific community.

Project S1830 coordinates all Navy efforts for the development of nuclear radiation detection devices. This includes hand-held RADIAC meters, personnel dose measurement devices, and area monitors used to measure radiation fields. Present RADIAC instrumentation is based largely on obsolete electronic technology and incurs expensive calibration and maintenance costs. The fielding of a new generation of microprocessor based instrumentation will cut calibration costs by up to 75% and reduce the requirements for spare parts by 85% when all older technology equipment is replaced. The estimated savings to investment ratio of this program is approximately 5 to 1. New requirements for the measurement of lower tritium and neutron levels necessitate the development of modernized instrumentation. The program is critical to joint-service radiation safety initiatives within DOD and has been coordinated with Army, Air Force, and Defense Nuclear Agency personnel to achieve the maximum cross-service applicability.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603542N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Radiological Controls

PROJECT NUMBER: S1825 PROJECT TITLE: Radiological Controls

C. (U) DESCRIPTION: Development of computer modeling program (MREMS) for estimating radiation exposure levels from nuclear weapons onboard ships (past and present), and in shore storage. Refine neutron measurement capabilities of Navy dosimetry from weapons and other industrial sources.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Interim correction factors for the DT648 dosimeter are in place.
- b. (U) Trident II baseline calculations completed.
- c. (U) Buildup and albedo kernels for thin shields have been published; searchlight method for ray-trace code in MREMS has been completed.

2. (U) FY 1992 PROGRAM: Provide final correction factors for DT648 dosimeter. Complete Trident II study. Develop "parallel architecture" to run MREMS on personal computer.

3. (U) FY 1993 PLANS: Verify transport parameters and weapons output database. Continue "parallel architecture" development. Initiate evaluation of small neutron fields in high gamma fields associated with linear accelerators/x-ray machines.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: Naval Surface Warfare Center (NSWC), White Oak Laboratory, Silver Spring, MD.

F. (U) RELATED ACTIVITIES: Not Applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603542N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Radiological Controls

PROJECT NUMBER: S1830

PROJECT TITLE: RADIAC Development

C. (U) DESCRIPTION: Project S1830 involves the development of micro-processor based instrumentation (Multifunction RADIAC) which will consolidate the Navy's RADIAC requirements by using a general purpose display box with a number of calibrated probes instead of buying numerous special purpose instruments. A laser-heated personnel dosimetry system is being developed to provide better capability, sensitivity and accuracy than current systems.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Received and began evaluation of Dem/Val models for the Multifunction RADIAC (MFR) System. Developed MFR check source kit. Developed less expensive power supply for the Full Scale Development (FSD) model of the Laser Heated Thermoluminescent Dosimetry (LHTLD) System. Reduced LHTLD dosimeter size.

2. (U) FY 1992 PROGRAM: Complete evaluation of MFR Dem/Val models. Award option for FSD Phase for MFR System. Receive and evaluate FSD model of LHTLD System.

3. (U) FY 1993 PLANS: Complete development of basic MFR System (display unit and beta/gamma probe). Continue development of other MFR probes and LHTLD System. Begin Limited Production of basic MFR System. Develop competitive sources for LHTLD System production. Resume development of Underwater RADIAC, Neutron Dosimetry System, Explosive Ordnance Disposal (EOD) Personal Dosimeter, and Tritium Monitor.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: In House: NSWC White Oak, MD; Oak Ridge National Labs, Oak Ridge, TN; and Naval Sea Systems Command. Contractors: Laser Heated Thermoluminescent Dosimetry System work is performed by contractor, IST, Inc. Spokane, WA. Multifunction work is performed by SAIC and Sorrento Electronics. Both contractors are in San Diego, CA.

F. (U) RELATED ACTIVITIES: A Memorandum of Understanding is being circulated within the Air Force for the Multifunction RADIAC System.

G. (U) OTHER APPROPRIATIONS FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603553N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Surface Anti-Submarine Warfare (ASW)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1704	ASW Advanced Development	35,186	60,259	61,882	CONT	CONT
S0229	Surface Ship Silencing	9,232	7,034	8,312	CONT	CONT
TOTAL		44,418	67,293	70,194	CONT	CONT

B. (U) DESCRIPTION: This program develops surface antisubmarine warfare combat system and surface ship silencing technology. The Surface Ship Silencing Project develops technology to reduce sonar self-noise and radiated noise, particularly at high operating speeds. The ASW Advanced Development Project develops technology for surface ship ASW systems improvements, supporting sea tests for , and for multistatic sonar system concepts.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603553N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Surface Anti-Submarine Warfare (ASW)

PROJECT NUMBER: S1704

PROJECT TITLE: ASW Advanced Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE CONT	TOTAL PROGRAM CONT
S1704	ASW Advanced Development	35,186	60,259	61,882		

B. (U) DESCRIPTION: This project provides for the advanced development and validation of technology for ongoing surface ship ASW system improvement programs and emerging ASW combat systems such as multistatic sonar. It supports the continuing development of

submarine threat.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:

- a. (U) Completed evaluation of Reconfigurable Multiline Evaluation System (RMES) array gain and bearing accuracy in 3x3 configuration for Multistatic Sonar System (MSS) Proof of Principal (POP) sea trial.
- b. (U) Completed fabrication of mid-frequency Phase I active classification processor for testing aboard USS ALWYN.
- c. (U) Initiated fabrication of next generation prototype low frequency sources from Alliant Techsystems and Raytheon.
- d. (U) Completed fabrication, installation and integration of Hughes and GE multistatic active receive processors for USNS Glover.
- e. (U) Completed fabrication and installation of the MSS POP towed transmitter aboard R/U ENSCO Trojan.
- f. (U) Completed acoustic test software for Long Line Hydrophone Calibrator (LLHC) as well as prototype transducers and mechanical system.
- g. (U) Completed Phase I contact management at-sea Advanced Development Model (ADM) hardware and software.
- h. (U) Completed development and verification of Contact Management Input Data Simulator (CMIDS), contact management test bed simulator.

2. (U) FY 1992 Program:

- a. (U) Develop low frequency transmitter velocity control techniques.
- b. (U) Complete array interaction and cavitation assessments.
- c. (U) Initiate Multi-Line Towed Array (MLTA) performance improvements, i.e.,
- d. (U) Complete MSS ADM transducer prototype.
- e. (U) Conduct MSS POP CS and Duct Sea Trials.
- f. (U) Initiate clutter reduction and Pseudo Random Noise (PRN) waveform analysis.
- g. (U) Complete mid-frequency active classification processor sea trial aboard USS ALWYN.
- h. (U) Complete integration of multiplatform data fusion algorithms and conduct shore-based and at-sea demonstrations.
- i. (U) Complete fabrication of mechanical system and test enclosure development for the LLHC.

3. (U) FY 1993 Plans:

- a. (U) Initiate fabrication of low frequency active demonstration transducers.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603553N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Surface Anti-Submarine Warfare (ASW)

PROJECT NUMBER: S1704

PROJECT TITLE: ASW Advanced Development

- b. (U) Conduct MSS CZ and Northern Water sea trials.
- c. (U) Complete PRN wave form analysis effort.
- d. (U) Conduct Phase II contact management ADM sea trial demonstration.
- e. (U) Complete test and installation of LLHC mechanical and test enclosure subsystem.

4. (U) Program to Completion: This is a continuing program.

D. (U) WORKED PERFORMED BY: IN-HOUSE: NUSC, New London, CT; NOSC, San Diego, CA; NRL, Washington, DC and Orlando, FL. CONTRACTORS: Johns Hopkins University, Laurel, MD; University of Texas, Austin, TX; Martin Marietta, Glen Burnie, MD; Orincon Inc., La Jolla, CA; ESL Inc., Sunnyvale, CA; Hughes Ground Systems, Buena Park, CA; EDO Inc., NYC, NY; Raytheon, Portsmouth, RI; Instruments, Inc., Los Angeles, CA; Alliant Techsystems, Mukiltco, WA; TRW, Fairfax, VA.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

- 1. (U) Technology changes: Not Applicable.
- 2. (U) Schedule changes: Not Applicable.
- 3. (U) Cost changes: The decrease of \$2,408K associated with pricing adjustments.

F. (U) PROGRAM DOCUMENTATION: NAPDD (154-03) 3/87

G. (U) RELATED ACTIVITIES: Program Element 0604713N/S1916 Surface ASW Systems Improvement; AN/SQQ-89 (Improved): development of upgrades to the AN/SQQ-89 system to counter recently identified threat improvements, including reductions in radiated noise. PE 0602314N ASW Technology, undersea warfare exploratory development block programs.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603553N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Surface Anti-Submarine Warfare
PROJECT NUMBER: S0229 **PROJECT TITLE:** Surface Ship Silencing

C. (U) DESCRIPTION: Surface ship acoustic quieting provides for the development and at-sea demonstration of quieting techniques to reduce ASW surface ship

noise. Projects are directed toward increasing own ship survivability against a variety of acoustic threats.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments: Continued detailed design of prototype system for combatant. Completed first patch test of prototype candidates. Initiated detailed design of a Compound Air Masker System (CAMS) prototype installation. Developed measurement system and data acquisition procedures for

2. (U) FY 1992 Program: Complete plans for evaluation of CG 47 Class Ship. Continue detailed development of prototype coating system for a combatant. Continue

3. (U) FY 1993 Plans: Complete evaluation of CG-47 Class ship. Develop plans for DDG-51 class ship evaluation. Continue detailed development of a prototype system for a combatant. Continue

4. (U) Program to Completion: Complete DDG-51 class ship evaluation. Complete prototype installation and at-sea evaluation of system on a combatant. Complete installation and at-sea evaluation of CAMS on a combatant. Complete detailed design of initial new design quiet Demonstrate at-sea, parallel application of selected technologies on a single combatant. Continue

E. (U) WORK PERFORMED BY: IN-HOUSE: DTRC, Carderock, MD; NUSC, New London, CT;. **CONTRACTORS:** ARL/PSU, State College, PA; Epoch Engineering, Gaithersburg, MD; BBN, Cambridge, Mass.

F. (U) RELATED ACTIVITIES: PE 0602121N (Surface Ship Technology) and PE 0602323N (Submarine Technology).

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603555N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Undersea Superiority Technology Demonstration
PROJECT NUMBER: R2142 PROJECT TITLE: Undersea Superiority Technology Demo

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R2142 Undersea Superiority Technology Demo	0	0	100000	Cont.	Cont.

B. (U) DESCRIPTION: This program is a FY 1993 New Start that is fully coordinated with and supportive of the DOD initiative to focus significant science and technology resources in seven thrust areas. The program exploits technologies which support preservation of the U.S. Navy's undersea superiority through ambitious demonstrations that will lay the foundation for decisions on initiating full scale development and production of high priority systems. Key elements of the program are to develop and demonstrate: a) technology supporting an affordable, combat effective submarine; b) fixed and mobile ASW sensors; and c) highly effective in-stride remote mine hunting, detection, classification, and neutralization systems. The first emphasis complements the related DARPA Advanced Submarine Technology Program focus on hull, mechanical and electrical systems. These technology demonstrations are designed to validate the technical maturity and potential operational effectiveness of advanced technology concepts before committing to a full acquisition program. Subsequent system development risk associated with cost, schedule, and performance should be reduced commensurately.

(U) The Submarine technology effort will focus on developing and demonstrating technologies which will reduce risk and increase capability of future submarines. The effort will focus of the highest payoff areas of H,M&E and electronics systems and subsystems which require demonstration before they can be considered in a submarine design. Major emphasis will be placed on technologies supporting affordability.

(U) The ASW effort will formulate and demonstrate new approaches to detecting targets having reduced active and passive signatures. Technical approaches demonstrated will formulate and consider unconventional acoustic and non-acoustic sensors in both mono-static and bi-static implementations. The principal objective of this task is to significantly enhance existing platform ASW capabilities associated with potential regional conflicts.

(U) The mine countermeasures (MCM) task of this program will demonstrate high payoff, innovative advanced technologies focused primarily on open ocean mine avoidance and shallow water mine neutralization. Tasks will make maximum use of prototype hardware and software being developed in exploratory development or other programs.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Not applicable.
2. (U) FY 1992 PROGRAM: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603555N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Undersea Superiority Technology Demonstration
PROJECT NUMBER: R2142 PROJECT TITLE: Undersea Superiority Technology Demo

3. (U) FY 1993 PLANS:

- a. (U) Demonstrate sensor technologies to support detection of low target-strength submarines.
- b. (U) Assess industry technologies supporting affordable, combat effective submarine design.
- c. (U) Demonstrate potential combat effectiveness of advanced non-acoustic sensors for multi-mission ASW applications.
- d. (U) Initiate technology demonstrations to support integration of active/passive ASW processors.
- e. (U) Leverage Congressionally directed National Academy of Science and Naval Research Advisory Committee mine countermeasure studies and conduct an evaluation of industry developed technologies to focus efforts toward highest payoff technologies.
- f. (U) Develop mine countermeasure system designs and perform critical laboratory level demonstrations for surf zone, shallow water and deep water mine detection.
- g. (U) Prepare program plan for follow-on technology demonstrations supporting emerging DOD Technology Thrust in Undersea Superiority.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: JUNC, Newport, RI and New London, CT; NSWC, Bethesda, MD; Annapolis, MD; White Oak, MD; Panama City, FL; Dahlgren, VA; NBOD, Indian Head, MD; MARCORSYSCOM, Quantico, VA; NRL, Washington, DC; CONTRACTORS: System Primes TED ; Mitre, Reston, VA; Woods Hole Oceanographic Institute, Woods Hole, MA;

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.
2. (U) SCHEDULE CHANGES: Not applicable.
3. (U) COST CHANGES: +\$100M to initiate program.

F. (U) PROGRAM DOCUMENTATION: This is a new start program and a NAPDD is being prepared.

G. (U) RELATED ACTIVITIES: This is a Navy lead program with DARPA participation in the area of advanced sonar sensors and UUV power sources via the MSS program (PE0603226E). PE0602315N, Mine and Special Warfare Technology; PE0602314N, Undersea Surveillance and Weapons Technology; PE0603528N, Non-Acoustic ASW; PE0602323N, Submarine Technology; PE0603561N, Submarine (Advanced); PE0603747N, Advanced ASW Technology; PE0603504N, Submarine ASW Development, Advanced; PE0603569N, Attack Submarine Development; PE0604561N, Submarine (Engineering); PE0101228N, Trident Program. There is no duplication of effort between this program the DEMNS Mine neutralization program in PE 0603640M or the DARPA Advance Submarine Technology Program in PE0603569E.

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1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603555N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Undersea Superiority Technology Demonstration
PROJECT NUMBER: R2142 PROJECT TITLE: Undersea Superiority Technology Demo

- H. (U) OTHER APPROPRIATION FUNDS: Not applicable.
- I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.
- J. (U) MILESTONE SCHEDULE: To be determined.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603561N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Advanced Submarine System Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S2033	Adv Sub Systems Dev	31,144	40,861	119,894	Continue	Continue
S2034	R&D Submarine	20,076	17,519	35,073	Continue	Continue
	TOTAL	51,220	58,380	154,967	Continue	Continue

B. (U) DESCRIPTION: This program supports revolutionary research and developments in submarine technologies and their evaluation and demonstration on a submarine platform. This program will increase the application of the submarine technology base and provide subsystem design options not currently feasible. Project S2033 identifies the most promising technologies and transitions them into specific advanced development efforts. The program transitions technologies developed by Navy technology bases, the private sector, and the DARPA Advanced Submarine Technology Program; and establishes a Submarine Security Program. All advanced systems developed under this program have potential to support submarine systems improvements or a future new design. The initial emphasis will be on signature control for attack submarines. Project S2034 provides resources to convert an attack submarine to a dedicated R&D platform without loss of mission capability. This will provide for a dedicated at-sea platform for testing and evaluating advanced systems technologies applicable to existing and the next generation submarine.

(U) The Deputy Secretary for Defense has directed a study of Submarine Forces for the Future be conducted. The Joint Staff (JCS) is coordinating this study. Initiation of a new class of submarines as well as other submarine related systems will be evaluated, based on consideration of the threat, force level requirements, operational uses, maintenance and reconstitution factors and other efficiencies.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603561N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Submarine System Development
PROJECT NUMBER: S2033 PROJECT TITLE: ADVANCED SUBMARINE SYSTEMS
DEVELOPMENT

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S2033	Adv Sub Systems Dev	31,144	40,861	119,894	Continue	Continue

B. (U) DESCRIPTION: This Project will increase the application of submarine related technology base efforts and provide subsystem design options not currently feasible. This program transitions high priority projects from the DARPA Submarine Technology Program in accordance with the DARPA Transition Plan, the Submarine Security Program (SSP), and a program for submarine system technologies advanced development. Signature reduction technologies predominate in the selection of transition products, including the DARPA technologies. Candidate transitions include target strength, radiated noise and structural acoustic projects. The advanced systems developed under this project are potentially applicable to various submarine classes including future designs. The SSP focus is to decrease the detection vulnerability of attack submarines. This Project includes approximately 50 efforts ranging from low frequency stealth technologies, to cost and operational effectiveness studies, to system integration concepts. This project is essential to support Milestone 0 & I decisions for a New Attack Submarine (NAS).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Initiated NAS class mission analysis studies to support Milestone 0 (Feb 1992).
- b. (U) Continued development of advanced material applications, including prototyping of a composite propulsion shaft transitioned from the Office of Naval Technology (ONT) Surface Ship Technology Base Program (PE 0602121N).
- c. (U) Initiated development of advanced non-acoustic silencing techniques (including integration of related DARPA and SEAWOLF projects).
- d. (U) Continued utilization of, and support for, the Large Scale Vehicle (LSV) as an advanced hydroacoustic, hydrodynamic, and target strength technology test platform.
- e. (U) Transitioned Electromagnetic Launcher (EML) Advanced Technology Demonstration (ATD), completed detailed design, and began assessment of applicability of an electromagnetic torpedo launch system ATD.
- f. (U) Completed Unmanned Underwater Vehicle (UUV) tactical acoustic systems advanced development. Transitioned effort to PE 0604559N/S2094 Deep Submergence Technology.
- g. (U) Assessed candidate technologies for the NAS and later future SSN designs factoring in maturing DARPA, ONT, and industry technology developments.
- h. (U) Continued SSP focusing on low frequency active threat and countermeasures.
- i. (U) Completed NiCd Battery Development Program, Phase I (DARPA transition).
- j. (U) Developed Submarine Hydrodynamics/Hydroacoustics R&D plan for integration of DARPA, Navy 6.1, 6.2, and 6.3 (AES) programs.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603561N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Submarine System Development
PROJECT NUMBER: S2033 PROJECT TITLE: ADVANCED SUBMARINE SYSTEMS DEVELOPMENT

- k. (U) Transitioned DARPA Torpedo Lateral Weapon Launch System experiments into ship design impact study as UUV launch and retrieval alternative.
- l. (U) Transitioned DARPA developed capabilities in hydrodynamic modeling and structural acoustics into use as concept design methods for the NAS.
- m. (U) Transitioned ONT (PE 0602323N) developed Submarine Electrical Systems performance and stability computer simulation as a tool for NAS concept studies.
2. (U) FY 1992 PROGRAM:
- a. (U) Conduct NAS concept design and technology option studies, independent Cost and Operation Effectiveness Analyses (COEA), and explore additional concept design alternatives which can fulfill mission needs.
 - b. (U) Initiate Propulsor and Main Propulsion Unit engineering trade studies for NAS.
 - c. (U) Continue to evaluate and develop plans to mature promising DARPA, ONT, and industry technologies for submarine designs.
 - d. (U) Continue utilization of, and support for, the LSV as an advanced technology test platform.
 - e. (U) Continue advanced development of composite main propulsion shaft.
 - f. (U) Continue development of advanced non-acoustic silencing technologies.
 - g. (U) Continue an SSP; including at sea testing of techniques for target strength and signature control.
 - h. (U) Transition DARPA Non-Penetrating Periscope (NPP) project to R&D Submarine demonstration.
 - i. (U) Begin transition from ONT and DARPA Submarine Electric Drive technologies leading toward a large scale prototype demonstration.
3. (U) FY 1993 PLANS:
- a. (U) Complete NAS concept design studies and performance and cost tradeoffs to support Milestone 1 approval.
 - b. (U) Initiate Hull, Mechanical and Electrical (HME) Systems advanced development for NAS including Diesel Generators, Non-Chloroflourohydrocarbons (CFC) Refrigeration Plants, and Single Man Ship Control Systems.
 - c. (U) Continue Propulsor and Main Propulsion Unit development for NAS.
 - d. (U) Continue LSV utilization and support.
 - e. (U) Continue to evaluate emerging technologies.
 - f. (U) Continue development of advanced non-acoustic silencing technologies.
 - g. (U) Continue an SSP; development of advanced target strength and signature control devices.
 - h. (U) Initiate transition of DARPA Hydrodynamic/Hydroacoustic Tech Center and Navy 6.3 portion of Integrated Submarine Hydrodynamics R&D Plan.
 - i. (U) Continue Submarine Electric Drive large scale prototype design and initiate contracting for component manufacturing.
 - j. (U) Transition DARPA, ONT, and industry thick section composite projects into advanced development of a large scale submarine stern and bow for future designs.
 - k. (U) Complete NPP demonstration on R&D Submarine.
 - l. (U) Transition DARPA, ONT, and other submarine hull coatings R&D initiatives into an integrated coatings development.
 - m. (U) Complete ENL ATD testing and assessment.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603561N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Submarine System Development
PROJECT NUMBER: S2033 PROJECT TITLE: ADVANCED SUBMARINE SYSTEMS DEVELOPMENT

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: DTRC, Bethesda, MD; DTRC/ARD, Bayview, ID; NCSC, Panama City, FL; NUSC, Newport, RI; Portsmouth Naval Shipyard, Portsmouth, NH; CONTRACTORS: General Dynamics, EEDiv, Groton, CT; Newport News Shipbuilding, Newport News, VA; ARL/Penn State, State College, PA; APL/Johns Hopkins Univ., Laurel, MD.

E. (U) COMPARISON WITH FY 1992/93 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not Applicable.

2. (U) SCHEDULE CHANGES: Technology development schedules were adjusted to accelerate critical H&E systems developments for the New Attack Submarine.

3. (U) COST CHANGES: \$50,000K was added in FY 1993 for NAS efforts. This NAS adjustment continues NAS initiated concept design efforts from the FY92 Congressional addition of \$23,000K and initiates NAS systems advanced development. Other funding adjustments include a program restructure (-\$8,000K) and pricing adjustments for inflation and DBOF rates.

F. (U) PROGRAM DOCUMENTATION: Non-Acquisition Program Decision Document for Advanced Submarine Systems Development (NAFDD # draft); (NAS) JROCM-058-91 dtd 23 October 1991, Subj: Mission Needs Statement (MNS) for Attack Submarine Capability.

G. (U) RELATED ACTIVITIES:

- o NAS Engineering Development (new PE 0604XXX) after NAS Milestone I.
- o PE 0603569E, DARPA Advanced Submarine Technology Program
- o PE 0602323N, Submarine Technology
- o PE 0603504N, Advanced Submarine ASW Dev
- o PE 0603522N, Submarine Arctic Warfare Support Equip Program
- o PE 0603562N, Submarine Tactical Warfare Systems
- o PE 0603570N, Advanced Nuclear Power Systems.
- o PE 0604559N/S2094, Deep Submergence Technology
- o PE 0602121N, Surface Ship Technology
- o PE 0603555N, Undersea Superiority Tech Demonstration

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Information Exchange Program B-93 (US/UK) - Submarine Magnetic Silencing.

J. (U) MILESTONE SCHEDULE:

- o NPP demonstration on the R&D submarine (Dec 92)
- o SUPRELITE propulsor installation and at-sea evaluation (Mar 93)
- o Non CFC airconditioning plant compressor acoustic tests (Jun 93)
- o Alternative DARPA and 6.2 target strength technologies cost/benefit assessment (Jun 94)
- o Electromagnetic signature mobile deep water test facility in service (Sep 94)
- o Composite propulsion shaft installation on R&D submarine (Dec 94)
- o SSN LFA operational processor at-sea demonstration (Sep 95)
- o Advanced submarine electric drive 3000HP prototype performance tests (Jul 96)
- o 1/4 scale composite stern evaluation on LSV (Jun 97)

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603561N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Submarine System Development
PROJECT NUMBER: S2034 PROJECT TITLE: R&D SUBMARINE

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S2034	R&D Submarine	20,076	17,519	35,073	Continue	Continue

B. (U) DESCRIPTION: This Project provides resources to convert an attack submarine to a dedicated R&D platform without loss of mission capability. This will provide for a dedicated at-sea platform for testing and evaluating advanced systems technologies applicable to existing and the next generation SSNs. Developments from Navy, DARPA, and industry will be accommodated. Additionally, the attack submarine will be modified to significantly enhance its ability to accommodate multiple, high payoff technologies. Modifications include a large diameter torpedo tube, speed enhancement mechanisms, a turtleback to house external components, a reconfigurable stern, a large access opening, an instrumentation system and test center and penetrations to support project equipment installations. The R&D submarine will maintain its warfighting capability in addition to a principal mission of supporting submarine R&D.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- (U) Continued submarine modification detailed design effort including the conduct of 3 design reviews.
- (U) Conducted hull mapping to support design and prefabrication of the large diameter torpedo tube, large access opening and turtleback modifications.
- (U) Initiated long lead procurements including material for the large diameter torpedo tube.
- (U) Commenced prefabrication of the instrumentation system modification.
- (U) Began integration of the modifications into overhaul work package.
- (U) Continued R&D project evaluations as part of the R&D Submarine Program.

2. (U) FY 1992 PROGRAM:

- (U) Complete submarine modification design leading to Critical Design Review (CDR) in February 1992.
- (U) Continue long lead material procurements.
- (U) Continue prefabrication of the instrumentation system modification.
- (U) Commence prefabrication of the following mods: Large diameter torpedo tube and control system; Large diameter weapon handling.
- (U) Continue modification integration into overhaul work package.
- (U) Continue R&D project evaluations as part of the R&D Submarine Program.

3. (U) FY 1993 PLANS:

- (U) Continue modification material procurements.
- (U) Continue in progress prefabrication of modification components.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603561N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Submarine System Development
PROJECT NUMBER: S2034 PROJECT TITLE: R&D SUBMARINE

c. (U) Commence prefabrication of the following mods: Outboard assembly of the large diameter torpedo tube; Large access opening.
d. (U) Complete modification integration into overhaul work package.
e. (U) Continue R&D project evaluations as part of the R&D Submarine Program.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: DTRC, Bethesda, MD; NUSC, New London, CT; NUSC, Newport, RI; PMSY, Portsmouth, NH; NNSY, Portsmouth, VA; SUBNEPP, Portsmouth, NH; CONTRACTORS: General Dynamics, Electric Boat Division, Groton, CT; Rosenblatt, NY, NY; J.J. McMullen, Arlington, VA; CASDE, Arlington, VA; Westinghouse MTD, Arlington, VA.

E. (U) COMPARISON WITH FY 1992/93 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not Applicable.

2. (U) SCHEDULE CHANGES: Not Applicable.

3. (U) COST CHANGES: \$8,000K was provided in FY 1993 for cost estimates associated with prefabricating the modifications required for the submarine's R&D conversion. Most notable is the large diameter torpedo tube which requires the pre-overhaul construction and shipment of a hull quadrant. Prefabrication of the modifications is intended to permit efficient integration of the R&D conversion package with the submarine's FY94 refueling overhaul. In addition, various pricing adjustments for inflation and DBOF rates affected the programs funding level.

F. (U) PROGRAM DOCUMENTATION: Non-Acquisition Program Decision Document for R&D Submarine (NAFDD # draft).

G. (U) RELATED ACTIVITIES:

- o FE 0603569E, DARPA Advanced Submarine Technology Program
- o FE 0603504N, Advanced Submarine ASW Dev
- o FE 0603522N, Submarine Arctic Warfare Support Equip Program
- o FE 0603570N, Advanced Nuclear Power Systems
- o FE 0604502N, Submarine Communications
- o FE 0604503N, Submarine Sonar Development
- o FE 0604561N, SSN-21 Developments
- o FE 0604562N, Submarine Tactical Warfare System
- o FE 0604567N, Ship Subsystem Development/Land Based Test Site

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE:

- o Detailed design and prefabrication contract award (Mar 90)
- o Commence prefabrication (Jun 91)
- o Conduct critical design review (Mar 92)
- o Design data delivered (May 93)
- o Commence ship modification (Dec 93)
- o Complete prefabrication (Apr 95)
- o Complete ship modification (Jul 96)

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603562N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Submarine Tactical Warfare Systems
PROJECT NUMBER: S1739 **PROJECT TITLE:** Submarine Arctic Warfare Development

A. (U) RESOURCES: (Dollars in Thousands)						
PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1739	Submarine Arctic Warfare Development	8,303	6,910	7,349	CONT	CONT

B. (U) DESCRIPTION: This program responds to the continuing threat of submarines to conduct warfare in the Arctic, including ASW, tactical surveillance and other submarine support missions. Efforts include It develops advanced capabilities for U.S.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:
 - a. (U) Conducted ICE Exercise (ICEX) 1-91 and planned ICEX 1-92
 - b. (U) Developed configuration
 - c. (U) Completed fabrication of IPM-2 Ice Penetration Model
 - d. (U) Completed development of Towed Array Noise Canceller (TANC)
2. (U) FY 1992 Program:
 - a. (U) Conduct ICEX 1-92 and plan ICEX 1-93
 - b. (U) Test and TANC
 - c. (U) Develop and begin build
 - d. (U) Test IPM-2 at CRELL and publish results
 - e. (U) Plan testing
3. (U) FY 1993 Plans:
 - a. (U) Conduct ICEX 1-93 and plan ICEX 1-94
 - b. (U) Conduct and continue
 - c. (U) Conduct
4. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: ASL, San Diego, CA; NUSC, Newport, RI; DTRC, Carderock, MD; NRL, Washington, DC. **CONTRACTORS:** AFL-University of Washington, Seattle, WA; Analysis and Technology Inc., North Stonington, CT; ARL-University of Texas, Austin, TX.

E. (U) RELATED ACTIVITIES: PE 0602314N Undersea Surveillance and Weapons Technology, 0602323N Submarine Technology, and 0602435N Ocean and Atmosphere Support Technology provide technologies for advanced development efforts.

F. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603564N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Ship Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	FY 1991 TITLE ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0408	Ship Development (Advanced) 5,288	741	3,476	CONT.	CONT.
S2036	Ship Design Methods, Plans, Concepts 0 (NOTE 1)	4,222	8,469	CONT.	CONT.
S2087	Fast Sealift Technology Development 3,348	0	0	0	14,945
	TOTAL 8,636	4,963	11,945	CONT.	CONT.

Note 1: The work in this project was accomplished under Project S0408 prior to FY 92.

B. (U) DESCRIPTION: The overall objective of the Ship Development (Advanced) Program is to enhance the Navy's ability to design more capable ships at reduced cost, with reduced manning and increased producibility and to allow for greater utilization of the latest technology during this process. This program is directly focused at supporting the Navy's Shipbuilding Plan by developing the tools needed and performing the advanced ship design (concept) studies and Feasibility Studies for new ships in that plan. Beginning in FY 1992 the work in Project S0408 will be divided into Projects S0408 and S2036 to improve overall management.

(U) Project S0408, Ship Development (Advanced), performs the dedicated ship Feasibility Studies, i.e., the work required between Milestone (MS) 0 and MS I in the ship design process. Feasibility studies provide the alternatives for the Cost and Operational Effectiveness Analysis (COEA) and support the development of the Operational Requirements Document (ORD).

(U) Project S2036 (Ship Design Methods, Plans and Concepts) is a continuation of a portion of the work accomplished under S0408 in previous years (i.e., Pre-Milestone 0 work). Project S2036 identifies future surface ship requirements and characteristics necessary to meet future threats; develops ship design engineering methods and criteria; provides the required design tools; develops investment strategies for new concepts and technologies; and performs concept studies which provide system engineering of R&D concepts to assist in developing Milestone Zero Mission Need Statements (MNS). This project will serve as the foundation for affordable, future U.S. Navy surface ship design, construction and life cycle support. It will be the first step in the integration of the total ship system including the combat systems and the hull, mechanical and electrical (HME) systems.

(U) Project S2087, Fast Sealift Technology Development, addresses those technologies and applications that will benefit the near and mid-term sealift ships.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603564N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Ship Development

PROJECT NUMBER: 80408 PROJECT TITLE: Ship Development (Advanced)

C. (U) DESCRIPTION: This project supports the early phases of design (Advanced Concept Studies and Feasibility Studies) and Cost and Operational Effectiveness Analysis (COEA) studies for new surface ships in the Navy's Shipbuilding Program. Performs impact studies of warfare, hull, machinery and electrical subsystems on advanced ship designs. Develops the initial documentation and the design methodology required by government for the design of surface ships in the Shipbuilding Program. Develops and evaluates unconventional hull form concepts suitable for future acquisition. For FY 1992 and future years this project will perform Feasibility Studies and COEAs for new surface ships in the Navy's Shipbuilding Program which have reached Milestone 0. Completion of these phases allows review and approve to transfer of a ship program to the Ship Contract Design Program, PE 0604567N.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Conducted feasibility studies and COEA for the amphibious ship L(X). Continued planning of ship structure's design methodology. Performed HM&E and combat systems assessment of future combatants (low intensity or regional conflict) and other support ships. Assessed warfare and HM&E subsystems for advanced ships. Defined hull form and HM&E subsystems for advanced ships under the NATO SWG-6.

2. (U) FY 1992 PROGRAM: Complete amphibious ship L(X) feasibility studies.

3. (U) FY 1993 PLANS: Conduct feasibility studies and COEA for ships in the SCN plan which reach MS 0: AR(X), a repair ship; and ADC(X), a replacement dry cargo ship.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NCSC, Panama City, FL; DTRC, Bethesda, MD; NSWC, White Oak, MD; NOSC, San Diego, CA. CONTRACTOR: Johns J. Mc Mullen Assoc., Arlington, VA; Advanced Marine Enterprises, Arlington, VA; Rockwell Intl., Arlington, VA.

F. (U) RELATED ACTIVITIES: PE 0603508N, Ship Propulsion System (Advanced); PE 0603513N, Shipboard System Component Development; PE 0604567N, Ship Contract Design/Development (ENG); PE 0602121N, Surface Ship Technology; PE 0603573N, Electric Drive.

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603564N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Ship Development

PROJECT NUMBER: S2036

PROJECT TITLE: Ship Design Methods, Plans, Concepts

C. (U) DESCRIPTION: Identify future surface ship requirements and characteristics necessary to meet future threats; investigate new, affordable ship concepts and evaluate potential technologies necessary to support these concepts; provide design methods/tools to develop and evaluate ship concepts, and support early ship design and solve pressing fleet engineering problems; reduce/eliminate costs of fixing problems after the ships reach the fleet by improving quality in the design phases; develop investment strategies for new concepts and technologies and support development of Mission Need Statements (MNS) for future ships.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: (listed under Project S0408)

2. (U) FY 1992 PROGRAM:

a. Identify, characterize and assess new and emergent technologies. Develop R&D investment strategies for program development for those technologies with favorable cost/benefit comparisons.

b. Integrate new technologies in total ship concepts. Develop POM 94 ship characteristics and cost estimates in support of the SCN plan.

c. Develop and improve design methods, criteria, standards, and data bases; Specifically, begin reliability based structural design criteria/methods development, improve ship synthesis modeling, and methods for embedding electromagnetic interference (EMI) prevention in the early ship design (complete Baseline I, start Baseline II).

3. (U) FY 1993 PLANS:

a. Identify, characterize and assess new and emergent technologies and update the HM&E technology database. Develop R&D investment strategies which provide cost/benefit comparisons of these new concepts and technologies.

b. Integrate new technologies in total ship concepts. Develop ship concepts for potential ships 5-7 years out in the SCN plan, including ship size, configuration, capabilities and rough order of magnitude (ROM) ship costs. Identify areas/methods of commonality among ships to improve affordability and producibility.

c. Continue development of new and improvement of existing design methods, criteria, standards, and data bases, and ship synthesis models. Continue development of reliability based structural design methods/criteria including prediction of seaway hydrodynamic loads through use of state-of-the-art analytical methods which have been correlated with full scale trials, and begin work on structural strength determination of ship structures. Continue development of design criteria, methods, and analysis tools for embedding EMI prevention into the earliest stages of ship design, specifically continue Baseline II engineering to implement a prototype "below decks" modeling, and extend EM environment prediction capability of Baseline I. The increased FY93 and outyear funding is essential for correction of fleet problems and prevention of future design deficiencies.

4. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NSWC, Caderock, MD and Dahlgren, VA; CONTRACTORS: JJMA, Arlington, VA; Rockwell Intl., Arlington, VA.; AME, Arlington, VA.

F. (U) RELATED ACTIVITIES: PE 0603508N, Ship Propulsion System; PE 0603513N, Shipboard System Component Development; PE 0604567N, Ship Contract Design/Development (ENG); PE 0602121N, Surface Ship Technology.

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603570M

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Advanced Nuclear Power Systems

A. (U) RESOURCES: (Dollars in thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1258	Advanced Nuclear React Comp Sys Dev.	50,910	49,460	58,916	Continuing	Continuing
S1914	S6W Nuclear Propulsion Plant	29,184	30,027	29,793	30,389	427,619
	TOTAL	80,094	79,487	88,709	Continuing	Continuing

B. (U) DESCRIPTION: Work is directed toward the design, development and test of new and improved components and their related systems for use in nuclear propulsion plants. The intent is to develop safe, reliable, high-performance, long-life nuclear propulsion plants and components. Work includes development of a nuclear propulsion plant for the new SEAWOLF attack submarine. Work in other areas includes development of instrumentation and control equipment, fluid and heat transfer equipment, reactor plant equipment, and nuclear power technology for future fleet applications. Significant heat transfer technology improvements are being developed; work underway to improve steam generators, if successful, will significantly (and increase plant efficiency by improving heat transfer capability. New instrumentation and control equipment is needed because various fleet equipment is difficult to support, requires a growing maintenance effort and does not have the accuracy, reliability and efficiency offered with modern technology. In addition, (better component and system designs are being developed to, improve performance.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603570N BUDGET ACTIVITY: 4
 PROGRAM ELEMENT TITLE: Advanced Nuclear Power Systems
 PROJECT NUMBER: S1258 PROJECT TITLE: Nuclear Technology Development

A. (U) RESOURCES: (Dollars in thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1258	Nuclear Technology Development	50,910	49,460	58,916	Continuing	Continuing

B. (U) DESCRIPTION: The purpose is to design, develop, and test new and improved reactor components and systems for use in all types of naval nuclear propulsion plants.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Continued advanced heat transfer technology efforts to improve efficiency and prolong life expectancy,

and further conducted propulsion plant optimization and configuration work. Continued developing and evaluating improved components and plant configurations to ensure system compatibility.

b. (U) Began development of advanced, more reliable power supplies

c. (U) Continued design and development of new instrumentation and control equipment

Further developed advanced reactor plant detectors, diagnostic equipment, sensors, and data transmission means.

d. (U) Continued development of fluid transfer and control and electrical equipment emphasizing improved features.

e. (U) Continued development of reactor plant designs.

2. (U) FY 1992 PROGRAM:

a. (U) Develop advanced heat transfer technology; and continue

Complete preliminary design concepts for a heat exchanger application, and begin Conduct propulsion plant optimization work; develop and assess improved components and plant configurations such as advanced electrical systems and innovative raft and deck arrangements.

b. (U) Develop of advanced design power supplies that are Develop better data transmission means

c. (U) Design and develop advanced instrumentation and control equipment and initiate designs

d. (U) Develop improved fluid transfer and control and electrical equipment

e. (U) plant designs,

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603570N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Advanced Nuclear Power Systems
PROJECT NUMBER: S1258 **PROJECT TITLE:** Nuclear Technology Development

3. (U) FY 1993 PLANS:

a. (U)

Continue testing to support the design concept. Finalize the conceptual design for application.

b. (U) Carry out propulsion plant optimization work; further develop and evaluate improved components and plant configurations.

c. (U) Test and evaluate advanced power supplies and develop better data transmission means. Begin development of advanced power generation equipment.

d. (U) Conduct tests of advanced instrumentation and control equipment aimed and test

e. (U) Develop improved fluid transfer and control and electrical equipment; initiate design of an

f. (U) Continue to develop reactor plant designs.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: Contractors: Westinghouse Electric Corporation, Bettis Atomic Power Laboratory and Plant Apparatus Division, Pittsburgh, PA; General Electric Company, Knolls Atomic Power Laboratory and Machinery Apparatus Operation, Schenectady, NY.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) Technology changes: Not Applicable.
2. (U) Schedule changes: Not Applicable.
3. (U) Cost changes: Reduction of \$2.4M due to lower inflation assumptions and changes in DBOF rates.

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

G. (U) RELATED ACTIVITIES:

- FE 0602324N, Nuclear Propulsion Technology
- FE 0205675N, Operational Reactor Development
- There is no duplication of effort within the Navy or the Department of Defense.

H. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603570N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Advanced Nuclear Power Systems

A. (U) RESOURCES: (Dollars in thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1914	S6W Nuclear Propulsion Plant	29,184	30,027	29,793	30,389	427,619

B. (U) DESCRIPTION: This effort is developing aspects of the nuclear propulsion plant for the SEAWOLF (SSN 21) attack submarine. Work is directed toward design, development, and test of pumps, instrumentation and control equipment, valves, heat transfer equipment, and plant arrangements. A key objective is to meet stringent goals so the SEAWOLF attack submarine will have an advantage over adversaries well into the next century. Accomplishing requires applying new quieting features throughout the plant and especially to large rotating equipment. Also, the propulsion plant will be increased to achieve the overall displacement and performance goals.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Further evaluated and analyzed designs for reactor components such as pumps and valves and heat transfer equipment to ensure engineering goals for improved performance were met.

b. (U) Completed testing of instrumentation and control equipment

c. (U) Continued design, development, and qualification of plant components, fluid systems and shielding to support equipment procurement and ship construction schedules; Prepared system drawings and operating and acceptance test procedures. Tested components to confirm adequacy.

2. (U) FY 1992 PROGRAM:

a. (U) Continue to evaluate and test reactor plant components such as pumps, valves, and heat transfer equipment.

b. (U) Continue check-out and compatibility testing of instrumentation and control systems

c. (U) Qualify plant components, systems and arrangements:

1. (U) Continue detailed fluid system, shielding, and component designs to support equipment procurement and ship construction schedules; analyze designs/

2. (U) Continue to prepare and review system drawings, and operating and acceptance test procedures.

3. (U) Test components and systems

3. (U) FY 1993 PLANS:

a. (U) Complete evaluating reactor plant components.

b. (U) Continue compatibility testing of instrumentation and control systems,

c. (U) Qualify plant components, systems, and arrangements:

1. (U) Complete detailed component design and evaluation to support equipment procurement; continue fluid systems and shielding design and evaluation, and production of drawings to support ship construction schedule.

2. (U) Continue preparing and revising systems drawings, develop and verify operating and acceptance test procedures.

3. (U) Continue integrated systems and components tests

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603570N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Advanced Nuclear Power Systems
PROJECT NUMBER: S1914 **PROJECT TITLE:** S6W Nuclear Propulsion Plant

4. (U) **PROGRAM TO COMPLETION:** This project will be considered complete in FY 1994.

D. (U) **WORK PERFORMED BY:** Contractors: Westinghouse Electric Corporation, Bettis Atomic Power Laboratory and Plant Apparatus Division, Pittsburgh, PA; General Electric Company, Knolls Atomic Power Laboratory and Machinery Apparatus Operation, Schenectady, NY.

E. (U) **COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:**

1. (U) Technology changes: Not Applicable.
2. (U) Schedule changes: Not Applicable.
3. (U) Cost changes: Reduction of \$1.2M due to lower inflation assumptions and changes in DBOF rates.

F. (U) **PROGRAM DOCUMENTATION:** Not Applicable.

G. (U) **RELATED ACTIVITIES:**

- PE 0602324N, Nuclear Propulsion Technology
- PE 0205675N, Operational Reactor Development
- There is no duplication of effort within the Navy or the Department of Defense.

H. (U) **OTHER APPROPRIATION FUNDS:** This is a non-acquisition program.

I. (U) **INTERNATIONAL COOPERATIVE AGREEMENTS:** Not Applicable.

J. (U) **MILESTONE SCHEDULE:** Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603573N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: ELECTRIC DRIVE

PROJECT NUMBER: S1314 PROJECT TITLE: ELECTRIC PROPULSION SYSTEM

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1991 ACTUAL	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1314	ELECTRIC PROPULSION SYSTEM	52,983	39,254	99,177	CONT.	CONT.

B. (U) DESCRIPTION: This Program Element supports the Advanced Surface Machinery System (ASMS) Program which develops advanced machinery and subsystems for surface ship propulsion, electric and auxiliary requirements. The name of this program has been changed from the Integrated Electric Drive (IED) Program to better reflect program content and emphasis. The Navy has recently reassessed and reprioritized Surface Navy requirements and investment strategy considering the rapidly changing world situation and increased emphasis on affordability. The current investment strategy stresses affordability, flexibility and the ability to reconstitute capabilities. The InterCooled Recuperated (ICR) gas turbine engine, Standard Monitoring and Control System (SMCS), and an improved electrical distribution system have been identified as candidates for FY 1999 DDG-51 engineering changes. The restructured ASMS program emphasizes near-term deliverables, particularly ICR and SMCS, and completes the existing Electric Drive (ED) contract. The program emphasizes concurrent engineering and systems engineering to develop a top-down architecture; technology development to advance critical machinery components; and industrial processes to shorten duration, and reduce manhours associated with the design and construction of naval ships.

(U) Program efforts are focussed on the ICR engine advanced development, SMCS, improved electrical distribution system and completion of the ED contract:

1) (U) ICR Gas Turbine Engine. ICR will significantly reduce life cycle fuel cost and provide a minimum-impact alternative to increase range in forward-fit applications. The contract for ICR advanced development was awarded to Westinghouse Electric Corporation in Dec 1991.

2) (U) Standard Monitoring and Control System (SMCS). This system will integrate the sensing, transmission, interpretation and display of HM&E parameters necessary for machinery control, condition monitoring/assessment, signature control and damage control management. SMCS offers significant potential to reduce acquisition cost and introduce a standard system for application across multiple platforms taking maximum advantage of open-system architecture and industry/military standards. A Canadian Defense Sharing Program with US industry involvement is planned for SMCS development. Products of this development will be a functional specification and software package to support full and open competitive acquisition for future shipbuilding programs.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603573N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: ELECTRIC DRIVE

PROJECT NUMBER: 81314 PROJECT TITLE: ELECTRIC PROPULSION SYSTEM

3) (U) Electrical Distribution System. Initial electrical distribution plans will focus on a new standard architecture for electrical distribution designed to improve ship producibility and reduce ship cost. Future improvements will address rapid reconfiguration and automated control in response to incipient faults and casualty conditions.

4) (U) Electric Drive. The basic electric drive development is completing its third year under contract with GE. The restructured program will complete the current ED contract and associated performance-verification testing. A final report will document this phase of the program.

(U) Although Non-Acquisition Program Document (NAPDD) 259-03 dated 21 March 1991 established IED as a non-ACAT program and defined major program deliverables, the ICR development will transition to an acquisition status in FY 1992. The ICR engine represents the largest ASMS development effort and its acquisition approach is most consistent with an ACAT classification. The remaining elements of the program are more integral to the design of individual ships and less mature in terms of system concept. They will focus on providing specs and standards to support acquisition by future shipbuilding programs and should remain non-ACAT.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) IED Program Plan was signed by ASN (RD&A).
- b. (U) Completed ED Preliminary Design.
- c. (U) Released the RFP for ICR AD.
- d. (U) Initiated design and analysis to define PDSS physical and operational characteristics.
- e. (U) Initiated system architecture studies to define candidate electrical distribution and control system configurations.
- f. (U) Conducted tradeoff studies to identify propulsor concepts offering improved cavitation performance and efficiency.
- g. (U) Conducted ship design studies in destroyer, amphibious and auxiliary support ships to quantify machinery system benefits and identify a target ship for fleet introduction.

2. (U) FY 1992 PROGRAM:

- a. (U) Conduct Critical Design Review on the electric drive contract.
- b. (U) Award ICR engine contract.
- c. (U) Complete ship service distribution, Standard Monitoring and Control System (SMCS), and auxiliary distribution architecture studies and initiate development.
- d. (U) Complete Systems Analysis/engineering tradeoff report.
- e. (U) Award Standard Monitoring and Control System Contract.

3. (U) FY 1993 PLANS:

- a. (U) Complete check-out of first electric drive shaft set.
- b. (U) Deliver first electric drive shaft set to test site.
- c. (U) Put Westinghouse team in place. Conduct parallel efforts in engine, heat exchanger, and controls development. Conduct design review on ICR engine contract.
- d. (U) Begin laboratory demo of control system and electrical distribution system.
- e. (U) Increase program efforts in ED, ICR, controls, and electrical distribution.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603573N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: ELECTRIC DRIVE

PROJECT NUMBER: S1314 PROJECT TITLE: ELECTRIC PROPULSION SYSTEM

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSEA, Washington DC; NAVSSES, Philadelphia, PA; DTRC, Annapolis, MD; DTRC Bethesda, MD; others as required. CONTRACTORS: General Electric, Fitchburg, MA, Westinghouse Electric Corp., Pittsburgh, PA and Sunnyvale, CA; Teledyne, Inet., Torrance, CA; PDI, Annapolis, MD; Henschel Engrg., Boston, MA; Purdue Univ., West Lafayette, IND; Texas A&M Univ., Austin, TX; and others selected.

E. (U) COMPARISON WITH FY 1992/93 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Transition ICR engine development to ACAT status. Maintain the remainder of the program as non-ACAT. In accordance with the Navy's Surface Warfare POM 94 Investment Strategy and Affordability/Military Effectiveness requirements, reduce the scope of the R&D effort by deferring portions of electric drive and advanced technologies.

2. (U) SCHEDULE CHANGES: Initiate FSD for the ICR engine in FY 1996.

3. (U) COST CHANGES: The program has been reduced by \$95.2M in FY 1993. The decrease is primarily associated with a program restructure (-90.2M) which deferred development efforts and pricing adjustments for inflation and DBOF rates.

F. (U) PROGRAM DOCUMENTATION

1. (U) Electric Drive and ICR APs and ICR RFP were revised in FY 1991 to reflect program restructuring. Program Plan dated 12 March 1991. NAPDD # 259-03 dated 21 March 1991.

G. (U) RELATED ACTIVITIES: PE 0602121N (Surface Ship Technology), DARPA Submarine Electric Drive Program.

H. (U) OTHER APPROPRIATION FUNDS: None.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE:

MILESTONE	DATE
RELEASE ICR ADVANCED DEVELOPMENT RFP	3Q/FY91
AWARD ICR	1Q/FY92
AWARD SMCS	3Q/FY92
ICR-1ST DESIGN REVIEW	3Q/FY93
DELIVER ED HARDWARE	3Q/FY93
COMMENCE ED TEST	4Q/FY93
LONG LEAD MATERIAL FOR FULL SCALE DEVELOPMENT	FY94
COMPLETE ADVANCED DEVELOPMENT - MILESTONE II	FY96
APPROVAL FOR LIMITED RATE OF PRODUCTION	FY96
COMPLETE FULL SCALE DEVELOPMENT - MILESTONE III	FY2000
APPROVAL FOR FULL RATE OF PRODUCTION	FY2000

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603582N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Combat System Integration

PROJECT NUMBER: S0164

PROJECT TITLE: Combat System Integration

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1991 ACTUAL	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0164	Combat System Integration	10,027	9,678	10,139	Continuing	Continuing

B. (U) DESCRIPTION: This project provides shore based testing of integrated combat direction, weapon, sensor and computing systems prior to their installation in operational fleet units. The operational computer programs are assembled and tested to assure proper configuration and interoperability in a test environment similar to their ultimate shipboard operational environment. This is the only opportunity for this type of testing of the full suite of individually developed and tested combat system operational programs prior to shipboard delivery. Combat system level configuration control is maintained by updates to the Surface Ship Combat System Master Plan (SSCSMP). In addition, Overall Combat System Operability Tests (OCSOTs) for shipboard testing of computer programs are developed.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Completed integration testing of: AN/SYS-2 Integrated Automatic Detection and Tracking System and AN/SPS-48E Radar in CV/CVN classes; and, Command and Control Processor (C2P) and Advanced Combat Direction System (ACDS) Block 0 in CG 16/26 classes.

b. (U) Initiated integration testing of: Anti Submarine Warfare Control System (ASWCS) upgrade in DD 963 class; and New Threat Upgrade (NTU) CGN 36 class.

c. (U) Continued OCSOT development and SSCSMP update.

2. (U) FY 1992 PROGRAM:

a. (U) Complete integration testing of: ASWCS upgrade in DD 963 class; and, NTU in CGN 36 class.

b. (U) Complete integration testing of: Automatic Identification system and, C2P and ACDS Block 0 in CV/CVN classes.

c. (U) Continue OCSOT development and SSCSMP update.

3. (U) FY 1993 PLANS:

a. (U) Conduct integration testing of: Antisubmarine Warfare Module 4.3 in CV/CVN classes; and, C2P in CGN 38 class.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603582N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Combat System Integration
PROJECT NUMBER: S0164 PROJECT TITLE: Combat System Integration

b. (U) Initiate integration testing of: Navy Tactical Command System-Afloat, in CV/CVN classes; and, Global Positioning System and Fire Control System MK 92 MOD 6 in FFG 7 class.

c. (U) Continue OCSOT development and SSCSNP update.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: INTCOMBATSYSTEMSTFAC, San Diego, CA; NAVSWC, Dahlgren, VA; NAVSHIPWPNSENGSTA, Port Hueneme, CA; FLTCOMBATDIRSSACT, Dam Neck, VA and San Diego, CA. CONTRACTORS: UNISYS, St. Paul, MN; Automation Industries, Vitro Lab, Silver Spring, MD; Integrated System Analysts, Inc., Arlington, VA.; COMPTER Research Inc., Arlington, VA; PRC, McClean, VA.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: None.

2. (U) SCHEDULE CHANGES: None.

3. (U) COST CHANGES: None.

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

G. (U) RELATED ACTIVITIES: Computer programs individually developed under the below activities are tested in their integrated configuration under this program.

- o PE 0205620N, ASW Combat System Integration
- o PE 0603228N, CV ASW Module
- o PE 06043401, MK 92 Fire Control System
- o PE 0604361N, NATO Sea Sparrow
- o PE 0604372N, New Threat Upgrade
- o PE 0604508N, Surveillance Radar
- o PE 0604518N, CIC Conversion
- o PE 0604602N, Gun Ammunition Improvement
- o PE 0604713N, SQG 89 Improvement

H. (U) OTHER APPROPRIATED FUNDS: Not Applicable.

I. (U) INTERNATIONAL CO-OPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603588N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: SSBN Survivability
PROJECT NUMBER: S1871 PROJECT TITLE: SSBN Survivability

A. (U) RESOURCES: (Dollars in thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE CONT	TOTAL PROGRAM CONT
S1871	SSBN Survivability	14,401	17,472	17,369		

B. (U) DESCRIPTION: The SSBN Security Program identifies countermeasures for maintaining or enhancing the current tactical superiority and stealth characteristics of the Fleet Ballistic Missile Submarine Force. The SSBN Survivability Program bridges the gap between the SSBN Security Program and full scale development by validating countermeasures and enhancing submarine survivability. The following projects are being developed under the SSBN Survivability Program:

transmissions; the

Out year countermeasure development programs will include but are not limited to;

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:

- a. (U) ATOMS - Incorporated the Naval Research Laboratory's (NRL) algorithm into the AN/BQR-23(V) Sonar Receiver (ATOMS II).
- b. (U) SCAEPS - Conducted second surface tow test, and prepared for submarine sea test.
- c. (U) CRIMSON - Refined modification alternatives to four designs.
- d. (U) JADE - Participated in two target-of-opportunity sea tests.
- e. (U) LFAA - Participated in the Propatria sea test using the PC based LFAIR system.
- f. (U) LFAIR - Completed implementation of the LFAIR algorithms into the AN/BQR-22A(EC-15). Transitioned technology in time for the New Sonar Intercept System (NSIS) RFP.
- g. (U) OBOE - Conducted Gulf of Mexico Optical Tower Tests.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603588N

BUDGET ACTIVITY: 3

PROGRAM ELEMENT TITLE: SSEN Survivability

PROJECT NUMBER: S1871

PROJECT TITLE: SSEN Survivability

- h. (U) RAMPART - Developed buoy mounted sensor system.
 - i. (U) TDASS - Completed development of the modules. Established procedures for implementation into the Ships Force Mission Program Library (SF MPL).
 - j. (U) TSM - Successfully conducted TSM-1 sea test.
2. (U) FY 1992 Program:
- a. (U) ATOMS - Conduct sea test of the ATOMS algorithms imbedded in the AN/BQR-23(V) Sonar Receiver.
 - b. (U) BCAFPS - Conduct submarine sea test in conjunction with ATOMS.
 - c. (U) CRIMSON - Conduct Large Scale Vehicle (LSV) initial shakedown tests at Lake Pend Oreille.
 - d. (U) JADE - Prepare for JADE-4 (buoy) sea test.
 - e. (U) LFAA - Provide interim coverage using the LFAIR PC based system.
 - f. (U) OBOE - Develop the Draft Utilization Plan.
 - g. (U) RAMPART - Conduct RAMPART-6 sea test (buoy mounted sensor). Leave sensors on the submarine for Mission 3 and 4 (data gathering).
 - h. (U) TDASS - Develop modules. Commence transition of modules to the SF MPL.
 - i. (U) TSM - Develop full-up real-time on board system.
3. (U) FY 1993 Plans:
- a. (U) ATOMS - Complete data analysis and develop transition specification.
 - b. (U) BCAFPS - Complete ECP development, initiate transition to EDM.
 - c. (U) CRIMSON - Test several modifications on the LSV at Pend Oreille.
 - d. (U) JADE - Conduct at sea engineering demonstration (including buoy sensors).
 - e. (U) RAMPART - Conduct Mission 3 and 4 analysis; develop system specification.
 - f. (U) TDASS - Develop modules. Commence transition of the Modules to the SF MPL.
 - g. (U) TSM - Conduct TSM-2 (ADM evaluation) sea test
4. (U) Program to Completion: This is a continuing program.

D. (U) WORKED PERFORMED BY: IN-HOUSE: NUSC, New London, CT; DTRC, Bethesda, MD; NRL, Washington, DC; NSWC, White Oak, MD; others to be determined.
CONTRACTORS: APL/JHU, Laurel, MD; Georgia Tech University, Atlanta, GA; Scientific Atlanta, San Diego, CA; Northwest Research Associates, Bellevue, WA; Applied Mathematics Incorporated (AMI), New London, CT; others to be determined.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603588N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: SSBN Survivability
PROJECT NUMBER: S1871 PROJECT TITLE: SSBN Survivability

- E. (U) COMPARISON WITH REVISED FY 1992/3 PRESIDENT'S BUDGET:
1. (U) Technology changes: Not Applicable.
 2. (U) Schedule changes: Not Applicable.
 3. (U) Cost changes: Not Applicable.
- F. (U) PROGRAM DOCUMENTATION: NAPDD 0128-02 (Rev 1) of 1 May 91
- G. (U) RELATED ACTIVITIES: SSBN Security Program (PE 0101224N, Project R0092) investigates all potential submarine detection technologies and identifies requirements for developing countermeasures to those technologies. Advanced Submarine Systems Development which contains the SSN Security Program (PE 0603561N, Project S2033) applies the SSBN Security/Survivability results to SSNs and develops SSN-specific countermeasures.
- H. (U) OTHER APPROPRIATION FUNDS: Not Applicable.
- I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.
- J. (U) MILESTONE SCHEDULE:
1. (U) TSM - Conducted initial proof of concept sea test. 3QFY91
 2. (U) TDASS - Conducted first module at sea demonstration. 3QFY91
 3. (U) LFAIR - Provided preliminary spec to NUSC. 4QFY91
 4. (U) BCAEFS - Conducted second surface tow test. 4QFY91.
 5. (U) BCAEFS - Conduct first submarine sea test. 4QFY92
 6. (U) ATOMS - Conduct sea test utilizing the AN/BQR-23A. 4QFY92
 7. (U) RAMPART - Conduct buoy sensor system sea test. 4QFY92
 8. (U) CRIMSON - Initiate LSV modification tests. 1QFY93
 9. (U) JADE - Conduct buoy mounted sensor system test. 1QFY93
 10. (U) TSM - Conduct full ADM system evaluation sea trial. 4QFY93

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603601N

BUDGET ACTIVITY 4

PROGRAM ELEMENT TITLE: Mine Development

A. (U) RESOURCES: (Dollars in thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1917	Remote Control of Mines (RECO)	50	0	0	0	7077
S2024	CAPTOR Improvement	3642	8625	632	Cont.	Cont.
	TOTAL	3692	8625	632	Cont.	Cont.

B. (U) DESCRIPTION: This program element provides funding for the development of new mines and mine systems, and major improvements to existing mine systems as dictated by the continual reduction of target signatures, improvements in mine countermeasures, improvements in target shock hardening and changes in U.S. Navy mining strategy and plans.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603601N

BUDGET ACTIVITY 4

PROGRAM ELEMENT TITLE: Mine Development-

PROJECT NUMBER: S2024

PROJECT TITLE: CAPTOR Improvement

C. (U) DESCRIPTION: Operational requirements exist for 2 wide-area coverage ASW mine programs: The CAPTOR Improvement Program (CIP) and the Advanced ASW Mine Program (SUBSTRIKE).

a. (U) The premise for the CIP is to ORDAIT (i.e. modify, resulting in CAPTOR Mod 2) the CAPTOR Mod 1 stockpile to affect improvements,

Justification is based on the continuing role of submarine warfare in Contingency And Limited Objective Warfare (CALOW) scenarios, and the considerable tactical flexibility of CAPTOR. Increased emphasis on periscope depth diesel-electric submarines necessitates reassessment of requirements and will result in changes to the design concept.

CAPTOR is stored ready to use, can be launched from surface, air or submarine platforms, acts as a force multiplier with other ASW platforms, and is mission adaptable via settable switches. Maintenance is required only once every four years and the mine operates autonomously after launch. The improvement program will re-use much of the existing mine hardware. CAPTOR's effectiveness has been demonstrated in Fleet exercises.

b. (U) The SUBSTRIKE program would address ASW mining in shallow to medium water depths. Mission reprioritization and funding reductions have limited near-term plans for this program to a Navy concept study accompanied by in-water sensor experiments.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) For CAPTOR and SUBSTRIKE, conducted in-water sensor experiments and began data analysis.

b. (U) Drafted Design Requirements Document, SOW and other pertinent parts of a Demonstration/Validation-Engineering & Manufacturing Development (D/V-EMD) contract data package for CAPTOR, and solicited review and comments from industry. Subsequently, a decision was made to conduct the D/V phase "in-house".

c. (U) SUBSTRIKE: analyzed concept alternatives, performed cost-performance tradeoff analyses and identified a preferred concept.

2. (U) FY 1992 PROGRAM:

a. (U) CIP: Complete sensor test data analysis and conduct at-sea case motion testing to determine effects of case and sensor array motion on sensor performance. Assess requirements impact of diesel-electric submarine proliferation in third world countries.

b. (U) SUBSTRIKE: Complete evaluation of sensor test data and design alternatives and write report.

3. (U) FY 1993 PLANS:

a. (U) Continue Concept Exploration (CE).

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVSWC, Silver Spring, MD, NMWEA, Yorktown, VA. Contractor: ARL/University of Texas, Austin, TX.

F. (U) RELATED ACTIVITIES: Not Applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603609N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: CONVENTIONAL MUNITIONS

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
SO363	Insensitive Munitions Advanced Development					
		21,478	22,322	28,069	CONTINUING	CONTINUING
S1821	Conventional Fuze/Warhead Package					
		31,155	20,532	34,248	CONTINUING	CONTINUING
	TOTAL	52,633	42,854	62,317	CONTINUING	CONTINUING

B. (U) DESCRIPTION: INSENSITIVE MUNITIONS ADVANCED DEVELOPMENT (IMAD) (Project SO363): Most Navy munitions react violently when exposed to unplanned stimuli such as fire, shock and bullet impact, thus presenting a great hazard to ships, aircraft, and personnel. This program will provide, validate and transition technology to enable production of munitions insensitive to unplanned stimuli with no reduction to combat performance. CONVENTIONAL FUZE/WARHEAD PACKAGE (Project S1821): The Navy requires improved lethality of air and surface launched ordnance to defeat advanced threats. Current specific requirements and initiatives to address them include: the ability to defeat anti-ship missiles attacking at extremely low altitudes by improving SPARROW Missile to defeat existing and near-term low-altitude targets; improve SPARROW Missile through the Missile Homing Improvement Program (MHIP) to counter deceptive countermeasures; demonstrate advance missile fuzing systems to defeat extremely low-altitude and low observable targets with the Advanced Threat Fuze (ATF). This project will, in future years, also provide the vehicle to address emergent requirements by transitioning mature fuze and warhead technology from conceptual developments to engineering development with minimum technical and financial risk.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603609N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: CONVENTIONAL MUNITIONS

PROJECT NUMBER: 80363 PROJECT TITLE: INSENSITIVE MUNITIONS
ADVANCED DEVELOPMENT

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL CONTINUING
80363	Insensitive Munitions Advanced Development	21,478	22,322	28,069	CONTINUING	CONTINUING

B. (U) DESCRIPTION: Most Navy munitions react violently when exposed to unplanned stimuli such as fire, shock and bullet impact, thus presenting a great hazard to ships, aircraft and personnel. This program provides validation and transition technology to all new weapon developments and priority weapon systems to enable production of munitions insensitive to these stimuli with no reduction in combat performance. The IM Advanced Development Program is the Navy's focused effort on propellants, propulsion units, explosives, warheads, fuses and pyrotechnics to reduce the severity of cook-off and bullet/fragment impact reactions, minimizing the probability for sympathetic detonation, both in normal storage and in use, increasing ship survivability and satisfying performance and readiness requirements. Each technology area is divided into subtasks addressing specific munition/munition class IM deficiencies. Energetic materials producibility is demonstrated to assure national capability to produce and load munitions systems. The program is being closely coordinated with other Military Departments, NATO and allied countries to eliminate redundant efforts and maximize efficiency. A joint service IM requirement has been developed. Insensitive munitions are identified as a DoD critical technology requirement.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- (U) Continued validation and shortfall analysis of weapon Plan of Action and Milestones (POAMs).
- (U) Continued large-scale testing of sympathetic detonation resistant and metal accelerating explosives.
- (U) Began qualification and scale-up of new IM minimum smoke propellant formulations.
- (U) Down selected to five advanced initiation systems.
- (U) Completed vulnerability tests on advanced propulsion concepts; demonstrated reactive case, composite and dual explosive warhead design concepts and designed generic container.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603609N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: CONVENTIONAL MUNITIONS

PROJECT NUMBER: 80363 PROJECT TITLE: INSENSITIVE MUNITIONS
ADVANCED DEVELOPMENT

2. (U) FY 1992 PROGRAM:
- a. (U) Continue validation and shortfall analysis of weapon PO&Ms, and select explosive candidate for general purpose bomb product improvement.
 - b. (U) Continue development of high performance metal accelerating explosives for fragmentation, shaped charges and submunitions.
 - c. (U) Perform large-scale hazard tests of advanced propellants and advanced case designs and conduct full scale testing of Insensitive Munitions Advanced Development (IMAD) warhead designs.
 - d. (U) Complete and document study of advanced case concepts and design methods.
 - e. (U) Complete continuous explosive processing studies.
 - f. (U) Evaluate new/improved barrier and dunnage materials for packaging; design and fabricate generic containers.

3. (U) FY 1993 PLANS:
- a. (U) Continue validation and analysis of PO&Ms; large scale advanced propellants vulnerability tests and full scale testing of ordnance items.
 - b. (U) Begin development of insensitive high-energy cruise missile booster propellant and rocket motor.
 - c. (U) Initiate development of high bubble energy underwater explosive for torpedo application.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY:

IN HOUSE: NSWC, Dahlgren, VA; NWC, China Lake, CA; DTNSRDC, Annapolis, MD; NWSC, Crane, IN; NOS, Indian Head, MD. CONTRACTOR: Not Applicable.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET;

- 1. (U) TECHNOLOGY CHANGES: Not Applicable.
- 2. (U) SCHEDULE CHANGES: Not Applicable.
- 3. (U) COST CHANGES: FY 1993 funds were increased by \$1.8M for DBOF adjustments.

F. (U) PROGRAM DOCUMENTATION: Non-acquisition Program Decision Document of 6/90.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603609N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: CONVENTIONAL MUNITIONS

PROJECT NUMBER: 80363 PROJECT TITLE: INSENSITIVE MUNITIONS
ADVANCED DEVELOPMENT

G. (U) RELATED ACTIVITIES: PE 0601153N, Defense Research Sciences, energetic materials research; PE 0602111N, AAM/ASUM Technology, PE 0602315N, Mine and Special Warfare; PE 0603262N, Aircraft Ordnance and Safety; and PE 0604602N, Naval Gunnery Improvement LOVA-76mm and 5"/54. Cooperative technology transfer efforts with all weapons project offices are in progress. Close liaison is maintained with PE 0603514N, Shipboard Damage Control Program.

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NATO AC/310 SG I

J. (U) MILESTONE SCHEDULE:

<u>Transition to Eng. Development</u>	<u>Date</u>
1. Reactive case warhead	FY 1991 (2nd Qtr)
2. Container/barrier designs	FY 1991 (4th Qtr)
3. Sympathetic detonation resistant explosive for large missile warheads and GP bombs	FY 1992 (3rd Qtr)
4. High performance explosive for shaped charge warheads	FY 1992 (4th Qtr)
5. Composite and armored warheads	FY 1992 (4th Qtr)
6. Insensitive rocket motor concept	FY 1992 (4th Qtr)
7. Explosive identification for bombs	FY 1992 (4th Qtr)
8. High output insensitive boosters for missile warheads	FY 1992 (4th Qtr)
9. New fuzing/detonator concept	FY 1992 (4th Qtr)
10. Insensitive low signature propellant	FY 1992 (4th Qtr)
11. Continuous processing/injection loading techniques	FY 1992 (4th Qtr)
12. Improved air blast explosive and radial booster	FY 1993 (4th Qtr)
13. Insensitive motor case design	FY 1993 (4th Qtr)
14. Alternate propulsion design concepts	FY 1993 (4th Qtr)
15. Insensitive booster propellants	FY 1993 (4th Qtr)
16. Insensitive underwater explosive	FY 1994 (4th Qtr)
17. Insensitive metal accelerating explosive	FY 1995 (1st Qtr)

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603609N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: CONVENTIONAL MUNITIONS
PROJECT NUMBER: S1821 PROJECT TITLE: CONVENTIONAL FUZE/WARHEAD PKG

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1821	Conventional Fuze/Warhead Package	31,155	20,532	34,248	CONTINUING	CONTINUING

B. (U) DESCRIPTION: The Navy requires improved lethality of air and surface launched ordnance to defeat advanced threats. This project improves SPARROW missile capability to defeat existing and near term deceptive counter measures with the Missile Homing Improvement Program (MHIP). This project also addresses the combined threat of low observable, low altitude encounters with the Advanced Threat Missile Fuze (ATF). This project also provides a single cost effective, more capable fuze to replace three obsolescent in-service fuzes with the multi-function projectile fuze. This project will, in future years, also provide the vehicle to address emergent requirements by transitioning mature fuze and warhead technology from conceptual development to engineering development with minimum technical and financial risk.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- (U) ADVANCED THREAT MISSILE FUZE SUBPROJECT: Fabricated second generation brassboards and conducted tests and analysis of performance.
- (U) MULTI-FUNCTION PROJECTILE FUZE SUBPROJECT: Fabricated 60 advanced development test units.
- (U) SPARROW MISSILE HOMING IMPROVEMENT PROGRAM (MHIP)
SUBPROJECT: Continued FSED; Completed development contract definitization; Completed NPDH review.

2. (U) FY 1992 PROGRAM:

- (U) ADVANCED THREAT MISSILE FUZE SUBPROJECT: Conduct Captive Carry Tests of fuze.
- (U) MULTI-FUNCTION PROJECTILE FUZE SUBPROJECT: Evaluate 15 units and initiate fabrication of next 60 units.
- (U) SPARROW MISSILE HOMING IMPROVEMENT PROGRAM (MHIP)
SUBPROJECT:
 - (U) SHIP SELF DEFENSE: Support analysis/trade-off studies to coordinate and refine element roles within ship self defense strategy; support development of system interface adaptations as necessary to provide effective ship self defense integration.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY
PROGRAM ELEMENT: 0603609N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: CONVENTIONAL MUNITIONS
PROJECT NUMBER: S1821 PROJECT TITLE: CONVENTIONAL FUZE/WARHEAD PKG

3. (U) FY 1993 PLANS:

- a. (U) ADVANCED THREAT MISSILE FUZE SUBPROJECT:
 - b. (U) MULTI-FUNCTION PROJECTILE FUZE SUBPROJECT: Evaluate 60 Fuzes and start procurement of 200 test fuzes.
 - c. (U) SPARROW MISSILE HOMING IMPROVEMENT PROGRAM (MHIP) SUBPROJECT:
 - d. (U) GUIDANCE INTEGRATED FUZE: Initiate project to fully integrate the functions of missile guidance and fuzing section to enhance performance while reducing cost, space and weight.
 - e. (U) ADVANCED AIMED WARHEAD: Develop capability to focus majority of warhead mass on the target rather than isotropically around the missile.
 - f. (U) ADVANCED AIMED FUZE: Develop the fuzing function necessary to initiate the Advanced Aimed Warhead.
 - g. (U) SHIP SELF DEFENSE: Support continuing analysis/trade-off studies and implementation of functional and performance allocations among elements comprising ship self defense systems, including system interface adaptations and preparation/conduct of associated tests and demonstrations.
4. (U) PROGRAM TO COMPLETION:

- a. (U) SPARROW MISSILE HOMING IMPROVEMENT PROGRAM (MHIP):
- b. (U) NEW INITIATIVES TO MEET EMERGING REQUIREMENTS: Initiate, develop and evaluate specific advanced development projects as required to enhance lethality and safety of air and surface target ordnance.
- c. (U) This is a continuing program.
- d. (U) WORK PERFORMED BY:
IN HOUSE: NWC, China Lake, CA; NSWC, Dahlgren, VA; PMTC, Ft. Mugu, CA; NWSC, Crane, IN. CONTRACTORS: Raytheon, Lowell, MA; Motorola, Scottsdale, AZ; General Dynamics, Pomona, CA; IRIS (Joint Venture of Raytheon and General Dynamics)

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603609N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: CONVENTIONAL MUNITIONS
PROJECT NUMBER: S1821 PROJECT TITLE: CONVENTIONAL FUZE/WARHEAD PKG

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) **TECHNOLOGY CHANGES:** Not Applicable.
2. (U) **SCHEDULE CHANGES:** _
3. (U) **COST CHANGES:** An increase of \$20.0M in FY 1993 to fund SPARROW MHIP program stretchout directed at 6/91 NPDM.

F. (U) PROGRAM DOCUMENTATION:

PMF 7/89
TEMP in OPTVFOR For Review
MHIP AP SEA 89-02/88-28 (Rev 1) Approved 7/91

G. (U) RELATED ACTIVITIES:

FE 0603755N, Ship Self Defense.
FE 0604366N, STANDARD Missile Improvements, Block IIIB MHIP fully describes the common milestones for this joint program that adds a common seeker to both STANDARD Missile and SPARROW Missile.

H. (U) OTHER APPROPRIATION FUNDS: (DOLLARS IN THOUSANDS)

WEAPONS PROCUREMENT, NAVY:

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
SPARROW MODS	30,090	29,800	56,900	CONTINUING	CONTINUING
WPN #19					

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable

J. (U) MILESTONE SCHEDULE:

DATE*

SPARROW Missile Homing Improvement Program CDR
SPARROW MHIP MS IIIA
SPARROW MHIP MS IIIB
SPARROW MHIP IOC

***NOTE: Milestone schedule reflects new program baseline for MHIP approved at the NPDM 6 JUN 91.**

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603610N BUDGET ACTIVITY 4
PROGRAM ELEMENT TITLE: Advance Warhead Development (MK 50)
PROJECT NUMBER: V1873 PROJECT TITLE: LIWT Torp (ADV)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
V1873	Advanced Warhead Development	5,108	6,587	9,205	Continuing	Continuing

B. (U) DESCRIPTION: Program improves the MK 50 Torpedo to ensure that it retains an advantage over the continuing and evolving Russian and Third World submarine threat. Program includes , warhead

propulsion (including Advanced Stored Chemical Energy Propulsion System (ADSCEPS)), guidance and control (G&C), computer software, electronic circuitry (including Very High Speed Integrated Circuit (VHSIC)) technology improvements, and Digital Fire Control (FC) Interface.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:
 - a. (U) Continued warhead development.
 - b. (U) Continued G&C, computer software, and propulsion development.
 - c. (U) Completed Pre-Planned Improvement (P²I) trade-off study.
2. (U) FY 1992 Program:
 - a. (U) Continue development.
 - b. (U) Continue G&C and computer software developments, start Digital FC Interface software and propulsion developments.
3. (U) FY 1993 Plans:
 - a. (U) Complete development (begin production in FY 94).
 - b. (U) Continue G&C, computer software, and propulsion developments.
4. (U) Program to Completion:
 - a. (U) Begin warhead development and production.
 - b. (U) Complete G&C and propulsion developments, start production, and continue tactical software changes.

D. (U) WORK PERFORMED BY: In-House: NSWC, White Oak, Silver Spring, MD; NUWC, Newport, RI; NCCOSC, San Diego, CA, ARL/PSU. Contractors: None.

E. (U) RELATED ACTIVITIES: PE 0604610N (MK 50 Torpedo): PSD for MK 50 Torpedo; PE 0602633N (Undersea Weapons Technology): New underwater warhead concepts; PE 0603792N, Advanced Technology Transition: G&C, warhead, and propulsion technologies.

F. (U) OTHER APPROPRIATION FUNDS: (Dollars in thousands)

	FY 1991 Actual	FY 1992 Estimate	FY 1993 Estimate	To Complete	Total Program
(U) Procurement					
MK50 Torp	327,802	261,663	254,628	To be continued	
WPN#44,#45					
Init. Spares	5,176	11,607	14,189	To be continued	
(U) MILCON	0	0	10,800	To be continued	

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603611M

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Marine Corps Assault Vehicles

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
B0020	AAA	18,040	29,599	64,134	CONT.	CONT.
B1293	SCRE	16,171	11,951	17,992	17,370	129,449
	TOTAL	34,211	41,550	82,126	CONT.	CONT.

B. (U) DESCRIPTION: The Advanced Amphibious Assault (AAA) Program will design, develop, produce, and field a successor to the Marine Corps current amphibian, the AAV7A1. The AAA will provide the Marine Corps with Over-The-Horizon (OTH) forcible-entry amphibious capability as well as the requisite survivability, firepower, and mobility to support operations ashore for the year 2000 and beyond. The Stratified Charge Rotary Engine (SCRE) is a Congressionally mandated development project for a lightweight/low volume, high horsepower engine for combat vehicles and other DoD applications. The SCRE is a candidate engine for the AAA program.

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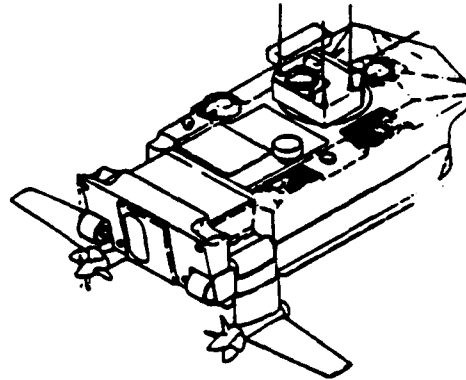
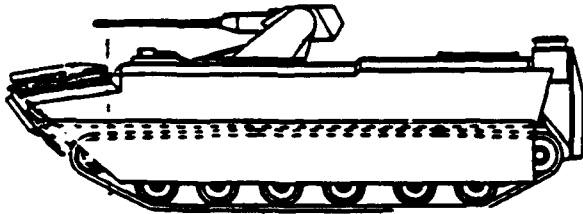
FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603611M

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Marine Corps Assault Vehicles

PROJECT NUMBER: B0020 PROJECT TITLE: Advanced Amphibious Assault (AAA)



CONCEPT A: LAND MODE

CONCEPT B: SEA MODE

POPULAR NAME: ADVANCED AMPHIBIOUS ASSAULT

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	TO COMPLETE
PROGRAM MILESTONES		MS-I 3rd Quarter		Continuing
ENGINEERING MILESTONES	Conceptual Mockups			Continuing
T&E MILESTONES				Continuing
CONTRACT MILESTONES			Demonstration/ Validation Award 2nd Qtr	Continuing
BUDGET (\$K)	FY 1991	FY 1992	FY 1993	Program Total To Complete
MAJOR CONTRACT	8,035	16,000	50,255	Continuing
SUPPORT CONTRACT	1,002	1,200	1,200	Continuing
IN-HOUSE SUPPORT	9,003	12,399	10,574	Continuing
GPE/ OTHER	0	0	2,105	Continuing
TOTAL	18,040	29,599	64,134	Continuing

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603611M

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Marine Corps Assault Vehicles

PROJECT NUMBER: B0020 PROJECT TITLE: Advanced Amphibious Assault (AAA)

B. (U) DESCRIPTION: Qualitative and quantitative improvements in equipment and forces of non soviet threats to US national interests have evidenced severe deficiencies in the Marine Corps' current assault amphibian, the AAV7A1. Significant improvements in the areas of offensive firepower, armor protection, water and land speed, cross country mobility, and overall crew and system survivability will be the main objectives during this design and development program for a replacement of the AAV7A1. The AAA will eliminate multiple mission area deficiencies in the ship-to-shore movement phase of the amphibious assault and during subsequent combat operations ashore.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:

a. (U) Planned, prepared, and conducted Pre-Defense Acquisition Board Milestone I Review briefings such as, the Acquisition Review Board (ARB), Marine Corps, Assistant Secretary of the Navy (ASN) Staff and Navy Acquisition Executive pre-briefs, Joint Requirements Oversight Council (JROC) review, management of AAA Conceptual Design and technical risk reducing contracts, government verification testing of Concept Exploration/Definition (CE/D) phase deliverables, review of Contract Data Deliverables and attendance at bi-monthly program reviews.

b. (U) Completed initial contractor AAA conceptual design studies.

c. (U) Completed technical evaluation of contractor initial conceptual design study reports.

2. (U) FY 1992 Program:

a. (U) Complete independent weight verification and engine candidate studies.

b. (U) Update contractor conceptual designs.

c. (U) Complete technical risk reducing experiments.

d. (U) Complete and receive approval for all program documentation.

e. (U) Conduct the Milestone I Defense Acquisition Board (DAB).

f. (U) Release the Demonstration/Validation (D&V) phase Request for Proposal (RFP).

g. (U) Conduct source selection.

3. (U) FY 1993 Plans:

a. (U) Award D&V phase cost plus fixed fee contract(s).

b. (U) Initiate contractor automotive test rig design and fabrication.

c. (U) Complete government verification testing of updated contractor armor samples and hydrodynamic models.

d. (U) Initiate design of a full scale hydrodynamic test rig.

e. (U) Commence full system prototype design.

4. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: DRPM AAA, Washington, DC. CONTRACTORS: (CE/D) FMC, San Jose, CA; General Dynamics Land Division, Detroit, MI. (D&V Phase) TBD.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603611M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Assault Vehicles
PROJECT NUMBER: B0020 PROJECT TITLE: Advanced Amphibious Assault (AAA)

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) Technical Changes: None.
2. (U) Schedule Changes: Initiation of technical risk reduction activities prior to the DAS Milestone I review has extended the Concept Exploration phase approximately 12 months.
3. (U) Cost Changes: FY 1993 funding increased by \$8,800 due to most current estimates from the Cost Operations Effectiveness Analysis (COEA) in preparation for the Defense Acquisition Board Review.

F. (U) PROGRAM DOCUMENTATION:

a. (U) Mission Area Analysis	December 1987
b. (U) Mission Need Statement	April 1988
c. (U) Initial Life Cycle Cost Estimate	May 1988
d. (U) Program Decision Meeting	July 1988
e. (U) Acquisition Decision Memorandum	August 1988
f. (U) System Threat Assessment Report	December 1990
g. (U) Cost and Operational Effectiveness Analysis	February 1991

G. (U) RELATED ACTIVITIES: Project B1293 (Stratified Charge Rotary Engine - SCRE) under this Program Element is related.

H. (U) OTHER APPROPRIATION FUNDS: First procurement funding requirements scheduled for FY 2003.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) TEST AND EVALUATION (T&E):

1. (U) FY 1989-1991 T&E Results: The following developmental tests were conducted:

a. (U) Armor panel tests were conducted on both Concept Exploration/Definition (CE/D) contractors' proposed armor schemes to validate their capability to defeat the specified threat.

b. (U) Hydrodynamic Model Tests were conducted on both CE/D contractors' 1/6 or 1/8 scale models of their proposed Advanced Assault Amphibious Vehicle (AAAV) designs. These tests were conducted to validate drag, ride quality, and power estimates provided by the contractors.

c. (U) Two Early Operational Assessments (EOA) were conducted on the CE/D contractors' full-scale AAAV mock-ups to evaluate safety, training, maintenance, operational requirements, and other human factors issues.

2. (U) FY 1992 T&E: No tests will be conducted by the government during FY 1992. The government will monitor and evaluate all contractor tests conducted in conjunction with their technical risk reducing experiments.

3. (U) FY 1993 T&E: T&E of the selected contractor's updated armor scheme and hydrodynamic design will be accomplished during FY 1993.

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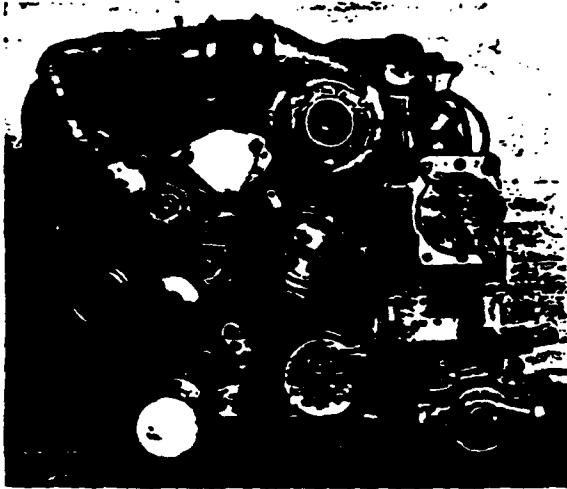
FY 1993 ROT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603611M

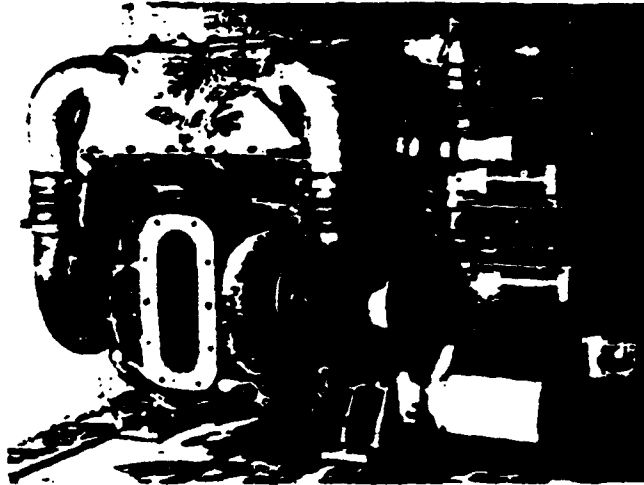
BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Marine Corps Assault Vehicles

PROJECT NUMBER: B1293 PROJECT TITLE: Stratified Charge Rotary Engine (SCRE)



(2) ROTOR



(3) ROTOR

POPULAR NAME: STRATIFIED CHARGE ROTARY ENGINE

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	TO COMPLETE
PROGRAM MILESTONES			MS-II 4th Quarter	Completes in FY 1995
ENGINEERING MILESTONES				Completes in FY 1995
T&E MILESTONES	DT	OT		Completes in FY 1995
CONTRACT MILESTONES				Completes in FY 1995
BUDGET (\$K)	FY 1991	FY 1992	FY 1993	Program Total To Complete
MAJOR CONTRACT	15,856	11,636	17,677	126,811 16,740
SUPPORT CONTRACT	60	60	60	600 120
IN-HOUSE SUPPORT	255	255	255	2,038 510
GFE/ OTHER	0	0	0	0 0
TOTAL	16,171	11,951	17,992	129,449 17,370

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603611M

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Marine Corps Assault Vehicles

PROJECT NUMBER: B1293 PROJECT TITLE: Stratified Charge Rotary Engine (SCRE)

B. (U) DESCRIPTION: To operate and survive in future threat environments, amphibious and combat vehicles must feature greater mobility, requiring higher horsepower output engines. Due to its inherently high power-to-weight/volume ratio, the SCRE offers significant increases in power without significant weight and volume penalties. It will also have fewer parts and utilize a wider range of fuels for potential reduction in the logistics burden and life cycle costs. As the SCRE embodies a family of engines from 375 horsepower to 3000 horsepower, there is a potential for use in many applications from generator sets to large combat vehicle applications.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:

- a. (U) The Family of Engines (FOE) DEV contract, which designs a modular engine family from (2) through (6) rotors, is near completion.
- b. (U) During this effort, the SCRE demonstrated the potential for developing output in excess of 500 horsepower per rotor.
- c. (U) The FOE contract permitted building and testing of several (2) and (3) rotor engine prototypes.
- d. (U) Completed assembly of all two-rotor and three-rotor FOE engines.
- e. (U) Conducted laboratory performance, environmental, reliability and durability testing of FOE engines.
- f. (U) Initiated design and ordered components for SCRE integration in AAV7A1.
- h. (U) A (2) rotor engine successfully passed the 400 hour NATO test, accumulating 530 hours of cycle time.
- i. (U) Performed teardown of the engine to assess component durability.
- j. (U) Data collected suggests that certain components do not have sufficient margin of safety when considering the diversity of operating conditions associated with combat vehicles in a marine environment.
- k. (U) A modification has been initiated to improve component reliability and durability and thereby improve the margin of safety of the engine performance parameters.
- l. (U) This modification will target component ratings at higher temperature and pressures, i.e. higher horsepower ratings of 600 horsepower per rotor.
- m. (U) Completed Developmental Testing (DT).

2. (U) FY 1992 Program:

- a. (U) Award a Demonstration and Validation (DEV) contract continuation for development of the Family of Engines (FOE) with the increased horsepower per rotor output rating from 375 to 550 Hp.
- b. (U) Perform component thermal, mechanical, and stress analysis at the higher power ratings.
- c. (U) Design, procure and assemble engine for test.
- d. (U) Perform analysis of redesigns for application to FOE concept.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603611M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Assault Vehicle
PROJECT NUMBER: B1293 PROJECT TITLE: Stratified Charge Rotary Engine (SCRE)

e. (U) Complete integration of SCRE in AAV7A1 and conduct application testing.

f. (U) Complete Operational Testing (OT).

3. (U) FY 1993 Plans:

a. (U) Conduct laboratory environmental, performance, reliability and durability testing on the updated FOE engines.

b. (U) Initiate installation of FOE engines into tracked vehicle platforms for Operational Testing (OT).

c. (U) Finalize documentation for Milestone II and prepare plans for transition to Engineering and Manufacturing Development (EMD) phase in the 4th quarter of FY 1993.

4. (U) Program to Completion: Complete EMD phase.

D. (U) WORK PERFORMED BY: IN-HOUSE: DTRC, Annapolis, MD. CONTRACTORS: John Deere Technologies Incorporated (JDTI), Wood Ridge, NJ.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: Not Applicable.

2. (U) SCHEDULE CHANGES: The decision to continue with DEV of the SCRE in order to obtain an engine with a greater horsepower rating per rotor will delay transition from DEV to EMD by 18 to 24 months.

3. (U) COST CHANGES: Not Applicable.

F. (U) PROGRAM DOCUMENTATION:

1. (U) Required Operation Capability (ROC) #MOB 0211.4.1 issued 4 April 1986.

2. (U) Acquisition Plan (AP) 256-88: Revision C. was issued 8 August 1988. Based on progress of the program, continuation of the DEV phase, and anticipation of greater capabilities of the SCRE, the AP is being revised with completion expected by second quarter FY 1992.

3. (U) A draft Integrated Logistics Support Plan (ILSP) has been written and is currently undergoing revision. The ILSP will be issued by second quarter FY 1992.

4. (U) A draft Test and Evaluation Master Plan (TEMP) has been written and is being updated to reflect the new 5000 series documentation. This should be completed in second quarter FY 1992.

G. (U) RELATED ACTIVITIES: Project B0020 (Advanced Amphibious Assault - AAA) under this Program Element and Project B0021 (AAV7A1 (PIP)) under Program Element 0206623M.

H. (U) OTHER APPROPRIATION FUNDS: First procurement funding requirements scheduled for FY 1998.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603611M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Assault Vehicle
PROJECT NUMBER: B1293 PROJECT TITLE: Stratified Charge Rotary Engine (SCRE)

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) TEST AND EVALUATION:

1. (U) FY 1991-1992 Developmental Testing
2. (U) FY 1991-1992 NATO Testing
3. (U) FY 1992-1993 Operational Testing

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603612M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Mine/Countermeasures Systems (Advanced Development)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C0077	Mine/Warfare	200	0	0	0	2,015
C2029	Directed Energy	3,392	0	0	0	5,470
C2106 ¹	DEMNS	0	0	3,607	CONT.	CONT.
	TOTAL	3,592	0	3,607	CONT.	CONT.

¹ This program was contained in Program Element 0603640M, Project C2078 Mine Neutralization in FY 1991 and FY 1992 and transitions to Program Element 0604612M, Marine Corps Mine Countermeasures Systems (Engineering Development) in FY 1995.

B. (U) DESCRIPTION: This program element includes an emerging technology which is projected to contribute to Marine Corps Mine/Countermeasures Systems capability. Focusing on countermine efforts, this program element will specifically develop a system which will neutralize mines. This program element is comprised of a project from Advanced Technology Transfer Demonstrations Program Element 0603640M (C2078 Mine Neutralization).

(U) Additionally, this element serves to support joint/cooperative work and technology transfer with the Army and Navy in areas where there is mutual interest because of the amphibious nature of USMC operations.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603612M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Mine/Countermeasures Systems (Advanced Development)
PROJECT NUMBER: C2106 PROJECT TITLE: Distributed Explosive Mine Neutralization System (DEMNS)

C. (U) DESCRIPTION: This program will demonstrate explosive, mechanical and electronic technologies and concepts for neutralizing advanced and hardened threat mines, as well as, wide area, standoff type mines.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Program contained in Program Element 0603640M, Marine Corps Advanced Technology Transfer Demonstration, Project Number C2078.

2. (U) FY 1992 PROGRAM: Program contained in Program Element 0603640M, Project Number C2078.

3. (U) FY 1993 PLANS:

- a. (U) Complete Milestone I requirements.
- b. (U) Conduct Preliminary Design Review.
- c. (U) Complete ATTD approval.

4. (U) PROGRAM TO COMPLETION: This program continues in Program Element 0604612M, Marine Corps Mine Countermeasures Systems (Engineering Development) in FY 1995.

E. (U) WORK PERFORMED BY: IN-HOUSE: NOS, Indian Head, MD. CONTRACTORS: TBD.

F. (U) RELATED ACTIVITIES: US Army Explosive Mine System ATTDs.

G. (U) OTHER APPROPRIATION FUNDS: NONE.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT 0603634N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Tactical Nuclear Development

PROJECT NUMBER: 50342 PROJECT TITLE: Tactical Nuclear Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
50342	Tactical Nuclear Development	8,575	3,970	7,948	CONT.	CONT.

B. (U) DESCRIPTION: This project strengthens deterrence and enhances Naval force survivability. Projects involve development of interface engineering for nuclear hardening of conventional offensive and defensive weapons systems for surface combatants, nuclear hardness testing of military equipment and development of nuclear effects survivability technology. It enhances Navy warfighting capabilities, and provides a hedge against foreign nuclear technological surprise.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Performed efforts in support of B61 Stockpile Improvement Program (SIP) engineering analyses and studies. Defined AAW Battle Management for Nuclear Air Battle Engagement Model (NABEM) technology base. Analyzed USS DEYO trial results for application to development of specifications and standards for Electromagnetic Pulse (EMP) hardened ships. Continued CY-92 trial preparation for AEGIS Cruiser. Conducted EMP trial of USS OLIVER H. PERRY (FFG-7) with two Naval Reserve units participating.

2. (U) FY 1992 PROGRAM:

a. (U) Prepare for the first at-sea EMP trial of new construction combatant (USS ANZIO CG-68). Continue analysis of test results for hardening standards.

3. (U) FY 1993 PLANS:

a. (U) Conduct first at-sea EMP simulation trial of new construction combatant (USS ANZIO) and analyze results. Develop new construction specifications and standards based on trial results. Detail planning for follow-on full threat ship trials.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NSWC, Silver Spring, MD/Dahlgren, VA; NWEF, Albuquerque, NM; DNA, Washington, DC/Albuquerque, NM; NATC, Pax River, MD; NSWSES, Port Hueneme, CA; DTAC, Carderock, MD. CONTRACTORS: Rockwell/GE-CESD/EG&G, Arlington, VA

E. (U) RELATED ACTIVITIES: PE 0204161N, Defense Nuclear Agency (DNA) Spare and Repair Parts and DNA Material; PE 0204162N, Practice Bombs; PE 0603514N, Project 30384, Ship Survivability (Advanced).

F. (U) OTHER APPROPRIATION FUNDS: DOE budgets and funds for their weapon development responsibilities in accordance with the DOD/DOE MOU.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: An agreement (S-78) to exchange survivability data with Great Britain exists and is being updated.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603635M

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Support System

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C1598	NBC Equipment	3,466	974	1,850	CONT.	CONT.
C1964	Joint Anti-Armor Weapons Systems	5,247	1,436	468	CONT.	CONT.
C2113 ¹	Short Range Anti- Tank Weapon	0	6,852	8,103	CONT.	CONT.
	TOTAL	8,713	9,262	10,421	CONT.	CONT.

¹ Program funded in Program Element 0603640M, Marine Corps Advanced Technology Transfer Demonstrations (ATTD), Project C2080, Weaponry in FY 1991.

B. (U) DESCRIPTION: This program element supports advanced development of Marine Corps Ground/Supporting Arms Systems for utilization in Marine Air- Ground Expeditionary Force amphibious operations.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603635M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Support System
PROJECT NUMBER: C1598 PROJECT TITLE: Nuclear/Biological/Chemical (NBC)
Equipment

C. (U) DESCRIPTION: This program develops NBC Equipment jointly with other services. Marine Corps efforts concentrate on amphibious characteristics involving Detection, Individual/Collective Protection and Decontamination.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Continued development of: Portable Collective Protection System Product Improvement (PCPS PIP); Remote Sensing Chemical Agent Alarm (RSCAAL); Individual Chemical Agent Detector (ICAD); Lightweight Chemical Biological Protective Suit (LWCBS); and M40 Gas Mask improvements.

b. (U) Started development of: M11 Stretch/ Decontamination System; and Chemical/Biological Detector (CBD); Supported Advanced Technology Transfer Demonstration (ATTD) NBC programs.

2. (U) FY 1992 PROGRAM:

a. (U) Continue development of: M40 gas mask improvements; ICAD/PIP; Chemical Biological Detector (CBD); Chemical Saratoga Suit (CSS); and Chemical Protective Undergarments (CPU).

b. (U) Start development of: Aerial Chemical/ Biological Detector Agent (ACBD); RSCAAL PIP; Chemical/Biological Mini Detector (CBMD); Lightweight Assault Mask (LWAM); Foam Decontaminate (FD); Modular Decontamination System (MDS); Automatic Decontamination System (ADS); Chemical/Biological Detection Kit (CBDK).

3. (U) FY 1993 PLANS:

a. (U) Continue development of CBD; FD; ACBD; RSCAAL PIP; CBDK; CBMD; MDS and ADS.

b. (U) Initiate demonstration/validation phase of NBC Reconnaissance System (NCBS).

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MARCORSYSOON, Quantico, VA; MCRDAC/NBC, Washington, DC; US Army NDEEC, Natick, MA; US Army CRDEC, Aberdeen, MD; and NSWC, Dahlgren, VA. CONTRACTORS: Environmental Technologies Group, Inc., Baltimore, MD; Brunswick Defense, Deland, FL; Battelle Inc., Columbus, OH; Ken Rob and Associates, Dahlgren, VA; and EASI, St. Louis, MO.

F. (U) RELATED ACTIVITIES: NONE.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT					
NBC Equipment	34,859	2,275	2,967	18,571	93,531

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603635M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Support System
PROJECT NUMBER: C1964 PROJECT TITLE: Joint Anti-Armor Weapons Systems
(JAAWS)

C. (U) DESCRIPTION: This project provides for the Marine Corps participation in the Joint Anti-Armor program entitled Javelin Advanced Anti-tank Weapon System-Medium (AAWS-M). This unique weapon system will provide the Marine Corps and Army with a state-of-the-art capability to destroy sophisticated and future armored threats. No such medium anti-armor system is currently available to the infantryman.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Continued monitoring and participating in the joint development and developmental testing of the Javelin (AAWS-M).

2. (U) FY 1992 PROGRAM:

a. (U) Continue to monitor and participate in the joint development, development testing, and operational testing of the Javelin (AAWS-M).

b. (U) USMC participation in joint DARPA/USA/USMC Anti-Armor program transfers to Program Element 0603640M, Marine Corps Advanced Technology Transfer Demonstrations (ATTD), Project C2117, Joint Armor/Anti Armor Technology in FY 1992.

c. (U) Advanced Anti-Armor Weapons System now named Javelin.

3. (U) FY 1993 PLANS: Continue to monitor and participate in the joint development and operational testing of the Javelin (AAWS-M).

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: US Army NICON, Redstone Arsenal, AL; NSWC, Dahlgren, VA; NWSA, Crane, IN. CONTRACTORS: Texas Instruments/Martin Marietta team, Denton, Texas.

F. (U) RELATED ACTIVITIES: Army Armor/Anti-Armor programs for heavy and light systems.

G. (U) OTHER APPROPRIATION FUNDS: NONE.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603635M

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Marine Corps Ground Combat/Support System

PROJECT NUMBER: C2113 PROJECT TITLE: Short Range Anti-Tank Weapon (SRAW)

C. (U) DESCRIPTION: The SRAW will provide the Marine Corps with a lethal, disposable, fire and forget, top-attack, soft launch for firing from enclosed spaces, proliferable, accurate, approximately 18 pounds, night vision capable, lightweight, main battle tank killer.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Program funded in Program Element 0603640M, Marine Corps Advanced Technology Transfer Demonstrations (ATTD), Project C2080, Weaponry, in FY 1991.

2. (U) FY 1992 PROGRAM:

a. (U) Continue Demonstration/Validation Phase of explosive payload and fusing with Loral vehicles 2 and 5.

b. (U) CTV's 2 through 5 were successfully flown in first quarter FY 1992.

3. (U) FY 1993 PLANS:

a. (U) Achieve Milestone II, full scale engineering development, in first quarter FY 1993.

b. (U) Initiate Engineering and Manufacturing Development (EMD)

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NSWC Dahlgren, VA; NWC, China Lake, CA. CONTRACTORS: Loral Aeronutronic Division, Newport Beach, CA, Hercules Co, Rocket City, WV.

F. (U) RELATED ACTIVITIES: NONE.

G. (U) OTHER APPROPRIATION FUNDS: NONE.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603640M

BUDGET ACTIVITY: 2

PROGRAM ELEMENT TITLE: Marine Corps Advanced Technology Demonstration (ATD)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C2078 ¹	Mine Neutralization	2,417	3,787	0	7,027	13,231
C2079 ²	Standoff Mine Detection	0	0	3,782	8,673	12,455
C2080	Weaponry	660	1,498	6,836	12,089	21,083
C2081	Battlefield Electronic Support	534	1,899	2,151	2,590	7,174
C2082	Chemical/Biological Defense	971	2,249	1,998	1,415	6,633
C2115	Joint Tactical Directed Energy Warfare Technology	0	499	2,460	CONT.	CONT.
C2117	Joint Armor/Anti-Armor Technology	0	3,999	2,601	CONT.	CONT.
C2118	Advanced Engine Propulsion Technology	0	3,499	3,310	6,029	12,838
	TOTAL	4,582	17,430	23,138	CONT.	CONT.

¹ FY 1993 funded in Program Element 0603612M, Marine Corps Mine/Countermeasure Systems (Adv. Dev.), Project C2106.

² FY 1991/1992 funded in Program Element 0603782M, Shallow Water Mine/Countermine Demonstrations, Project R2127.

B. (U) DESCRIPTION: Critical Marine Corps efforts being addressed in this program element are Standoff Mine Detection for surf zone and ashore; Mine Neutralization; Chemical/Biological Defense capability for Marine personnel and material; Advanced Infantry and Vehicle Mounted Weapon Systems; application of computer technology and advanced command and control architectures to Battlefield Electronic Systems and Command and Control Systems; protection from emerging laser weapons; and very high power/low-weight engines, drive-trains, suspensions for future vehicles. This is an ongoing program to develop and demonstrate advanced technologies and system concepts in a quasi-operational environment. Multiple transitions into the Demonstration/Validation phase are planned.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603640M BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Marine Corps Advanced Technology Demonstration (ATD)
PROJECT NUMBER: C2079 PROJECT TITLE: Standoff Mine Detection (SOMD)

C. (U) DESCRIPTION: Demonstrate stand off mine and minefield detection technologies for Marine Corps Over-the-Horizon Amphibious Assault. Requirements are real time, high speed operations. Airborne/ground and amphibious operations will be addressed by testing, modeling and analysis. Technology concepts demonstrated in operational tests and field environments. Program will be cooperative between USMC, Army, DARPA, and Navy.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: At Congressional direction, funds were placed in the Joint Navy/Marine Corps Mine Detection program (PE0603782N).

2. (U) FY 1992 PROGRAM: FY 1992 funds were placed in the Shallow Water Mine Countermeasure Demo program (PE0603782N) for the purpose of accelerating adaptation of the Magic Lantern 90 System to better meet Marine Corps requirements and to comply with Congressional intent.

3. (U) FY 1993 PLANS:

- a. (U) Initiate Advanced Technology Demonstration (ATD) for SOMD-GROUND and conduct technology survey and analysis.
- b. (U) Define systems concepts, continue experimental investigations, and initiate technology development and prototype design.
- c. (U) Initiate joint efforts with DARPA and Army in sensors, processing, test and evaluation.

4. (U) PROGRAM TO COMPLETION: Complete SOMD-GROUND. SOMD-AIRBORNE is a continuing project.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIR SYSTEMS Command, Naval Coastal System Center, Panama City, FL; Lawrence Livermore National Laboratory, Livermore, CA; Department of Energy, Las Vegas, NV; US Army Belvoir Research, Development and Engineering Center, Fort Belvoir, VA. CONTRACTORS: KAMAN Aerospace, Tucson, AZ and Bloomfield, CT; University of Washington, Seattle, WA; TED.

F. (U) RELATED ACTIVITIES: US Army Program Element 0603606A, Land Mine Warfare and Barrier Advanced Technology Remote Mine Detection System (monitoring), Airborne Mine Detection and Reconnaissance System (monitoring/joint testing). In compliance with Tri-service Reliance agreements.

G. (U) OTHER APPROPRIATION FUNDS: NONE.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603640M

BUDGET ACTIVITY: 2

PROGRAM ELEMENT TITLE: Marine Corps Advanced Technology Demonstration (ATD)

PROJECT NUMBER: C2080 PROJECT TITLE: Weaponry

C. (U) DESCRIPTION: This project will involve several Advanced Technology Demonstrations (ATDs) to address Marine Corps future weaponry needs. Substantial increase in firepower cannot be met through conventional weapons systems as they are approaching the theoretical performance limits within the physical limit constraints of weight and volume.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:
 - a. (U) Completed preliminary Electro-Magnetic Gun (EMG) system design.
 - b. (U) Conducted system design trade-offs.
2. (U) FY 1992 PROGRAM:
 - a. (U) Finalize EMG system design, fabricate prototype system.
 - b. (U) Generate approved Non-Acquisition Program Definition Document (NAPDD) for Advanced Lightweight Ground Weaponry, Team Target Engagement Simulator, and Special Purpose Weaponry ATD projects.
3. (U) FY 1993 PLANS:
 - a. (U) Award development contract and conduct Preliminary Design Review.
 - b. (U) Test fire Electro-Magnetic Gun System in single shot mode and refine system design.
 - c. (U) Develop hyper-velocity projectile.
 - d. (U) Initiate ATD for Advanced Lightweight Ground Weaponry, Special Purpose Weaponry, and Team Target Simulator.

4. (U) PROGRAM TO COMPLETION: This program completes in FY 1996.

E. (U) WORK PERFORMED BY: IN-HOUSE: MARCORSYSCOM, Quantico, VA; Army Research Development and Engineering Command, Picatinny Arsenal, NJ; Naval Weapons Center, China Lake, CA; Naval Surface Weapons Center, Dahlgren, VA. CONTRACTORS: University of Texas, Austin, TX. Others TBD.

F. (U) RELATED ACTIVITIES: PE0603004A, Joint Electric Armaments Programs and the Army's Large Caliber Electro-Magnetic/Electric-Thermal (EM/ET) development efforts. In compliance with Tri-service Reliance Agreements.

G. (U) OTHER APPROPRIATION FUNDS: NONE.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603640M

BUDGET ACTIVITY: 2

PROGRAM ELEMENT TITLE: Marine Corps Advanced Technology Demonstration (ATD)

PROJECT NUMBER: C2081 PROJECT TITLE: Battlefield Electronic Support

C. (U) DESCRIPTION: This project demonstrates several technologies to advance USMC Command Control Communications & Intelligence (C3I) systems, e.g., dedicated communications networks and specialized, proprietary computer hardware/software to automate systems using standardized open architectures, which are inter-operable with other C3I systems. Amphibious Assault Networking Technology (AANT) tailors a USN developed, non-dedicated radio net control system for use in Marine Tactical Systems (MTS).

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Initiated AANT Advanced Technology Demonstration (ATD).

b. (U) Assembled USMC AANT node on Unified Networking Technology (UNT)/Communications Support System (CSS).

2. (U) FY 1992 PROGRAM:

a. (U) Continue design of AANT gateway and begin fabrication of rapid prototype AANT.

b. (U) Initiate C2-2000 ATD in third quarter by investigating selected Marine Corps Tactical Command and Control subsystems from Field Development System one (FDS-1).

3. (U) FY 1993 PLANS:

a. (U) Begin assembly of AANT node on Navy CSS testbed.

b. (U) Continue initial system DT-0/DT-0 using rapid prototype.

c. (U) Continue development of selected MTACCS subsystems in preparation for FDS-2.

4. (U) PROGRAM TO COMPLETION: This program completes in FY 1994.

E. (U) WORK PERFORMED BY: IN-HOUSE: AANT- Marine Corps Tactical Software Support Activity (MCTSSA), Oceanside, CA; MOSC, San Diego, CA. C2-2000 - HDL, Adelphi, MD. CONTRACTORS: TED.

F. (U) RELATED ACTIVITIES: PE 0603717M, Command and Control Systems; PE 0603731M, U.S. Marine Corps C3 Systems (Advanced); PE0603772A, Battlefield Force Integration; PE0603794M, C3 Advanced Technology. In compliance with Tri-service Reliance agreements.

G. (U) OTHER APPROPRIATION FUNDS: NONE.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603640M

BUDGET ACTIVITY: 2

PROGRAM ELEMENT TITLE: Marine Corps Advanced Technology Demonstration (ATD)

PROJECT NUMBER: C2082 PROJECT TITLE: Chemical/Biological Defense

C. (U) DESCRIPTION: The High Mobility Multi-purpose Wheeled Vehicle (HMMWV) Nuclear Biological Chemical Reconnaissance System (NBCRS) Advanced Technology Demonstration will demonstrate advanced technologies for NBC reconnaissance, field biological-agent analysis, and disseminating NBC hazard information for expeditionary forces. The Lightweight Protective Suit/Rainwear ATD will demonstrate protective suit, rainwear and undergarment concepts for Marine Expeditionary Forces. The NBC Aerial Stand Off Detector ATD will demonstrate a passive Infra Red stand off agent detector and advanced algorithm for agent detection from aircraft or Unmanned Aerial Vehicle (UAV)/Remotely Piloted Vehicle (RPV). Chem/Bio Defense for Amphibious Vehicles will demonstrate new concepts for improved vehicle and crew NBC survivability in Marine Corps unique fighting vehicles.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) HMMWV NBCRS demonstration conducted in a field environment, validated advanced equipment/doctrinal concepts for USMC NBC reconnaissance.
- b. (U) Initiated Lightweight Suit/Rainwear and Aerial Stand Off Detector ATD projects.

2. (U) FY 1992 PROGRAM:

- a. (U) HMMWV NBCRS complete field demonstration (OT-O, DT-O) and finalize documentation for planned transition in FY 1993.
- b. (U) Initiate testing of lightweight suits/rainwear and aerial standoff detector prototypes (DT-O, OT-O).

3. (U) FY 1993 PLANS:

- a. (U) HMMWV NBCRS ATD will transition in first quarter, for Demonstration and Validation (DEMVAL).
- b. (U) Complete testing of lightweight suit/rainwear and aerial stand-off detector and prepare transition documentation.
- c. (U) Finalize hardware performance specifications for entry into DEMVAL phase.

4. (U) PROGRAM TO COMPLETION: This program completes in FY 1995.

E. (U) WORK PERFORMED BY: IN-HOUSE: MARCORSYSCOM, Quantico, VA., CRDEC, APG, MD.; NSWC, Dahlgren, VA.; NRDEC, Natick, MASS.; NRL, Wash, DC. CONTRACTORS: Battelle, Columbus, OH; KENROB & Associates, Dahlgren, VA., other contractors TBD.

F. (U) RELATED ACTIVITIES: PE0604806A, NBCRS (XM93) Program and Soldier Integrated Protective Ensemble (SIPE) program; In compliance with Tri-service Reliance agreements.

G. (U) OTHER APPROPRIATION FUNDS: NONE.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603640M BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Marine Corps Advanced Technology Demonstration (ATD)
PROJECT NUMBER: C2115 PROJECT TITLE: Joint Tactical Directed Energy Weapon
Technology

C. (U) DESCRIPTION: This project is intended to provide USMC participation in joint demonstrations of defensive and offensive directed energy technologies. Tactical Directed Energy Warfare (TDEW) has been classified into three categories: Radio Frequency energy, lasers, and particle beam technology. The focus is on multi-frequency applications and on protecting Marines and their electro-optic equipment.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Not Applicable.

2. (U) FY 1992 PROGRAM:

a. (U) Support to joint protection technology development.
Transition protection technology for optics/electro-optics to Program Manager (PM) for product improvement.

b. (U) Complete Counter Target Acquisition System (CTAS) II.5. Extend CTAS modeling.

3. (U) FY 1993 PLANS:

- a. (U) Support of joint protection technology development.
- b. (U) Assemble protection systems of USMC ACVs.
- c. (U) Continue CTAS modelling and analyses.
- d. (U) Design AAW and anti-armor systems.
- e. (U) Demonstrate frequency-agile protection.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MARCORSYSCOM, Quantico, VA; NADC, Warminster, PA; NPRDC, San Diego, CA; NWC, China Lake, CA; CONTRACTORS: TBD.

F. (U) RELATED ACTIVITIES: PE0602310E, Improved Protection Technologies, Survivability Management Office. PE0604710A and PE0603774A Advanced LASER Technologies. PE0602234N, PE0602786A, PE0602601A, and PE0602301E Joint LASER protection technologies. In compliance with Tri-service Reliance agreements.

G. (U) OTHER APPROPRIATION FUNDS: NONE.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: N/A.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603640M

BUDGET ACTIVITY: 2

PROGRAM ELEMENT TITLE: Marine Corps Advanced Technology Demonstration (ATD)

PROJECT NUMBER: C2117 PROJECT TITLE: Joint Armor/Anti-Armor Technology

C. (U) DESCRIPTION: The Joint Armor/Anti-Armor Technology Advanced Technology Program focuses on exploring high risk, innovative technologies or unconventional approaches to armor/anti-armor development. With a focus on light armors and infantry anti-tank weapons for Marines. The project addresses the disparity between US and threat armor/anti-armor capabilities and provides the USMC with the capability to execute a competitive modernization rate. FY 1991 efforts were funded in Program Element 0603635M, C1964 Joint Anti-Armor Weapons Systems. The U. S. Marine Corps participates in an MOU with DARPA and the Army.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Not Applicable.

2. (U) FY 1992 PROGRAM:

a. (U) Pursue advanced Conventional Energy (CE) warhead concepts - enhanced wave shaping for improved energy coupling, advanced CE liner materials.

b. (U) Develop advanced concept Kinetic Energy (KE) penetrators - alternate geometry penetrators, materials and hypervelocity projectile design.

c. (U) Initiate Phase I of the Mission Kill Program.

d. (U) Complete improved Light Applique Armor System (LAST) Task.

3. (U) FY 1993 PLANS: Pursue advanced CE warhead concepts - multi-purpose warhead technology, coupled CE and KE lethal mechanisms.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MARCORSYSCOM, Quantico, VA; DTRC, Bethesda, MD. CONTRACTORS: GDLS, Warren, MI; DuPont, Newark, DE; KAMAN, Colorado Springs, CO; FMC, San Jose, CA; Foster Miller, Waltham, MA.

F. (U) RELATED ACTIVITIES: PE0603226E, Close Combat, Project EE21; PE0602618A, Ballistics Technology, Project AH81. In compliance with Tri-service Reliance agreements.

G. (U) OTHER APPROPRIATION FUNDS: NONE.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Classified Advanced Armor Protection Programs with foreign partners.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603640M BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Marine Corps Advanced Technology Demonstration (ATD)
PROJECT NUMBER: C2118 PROJECT TITLE: Advanced Engine Propulsion Technology

C. (U) DESCRIPTION: This program will focus on the development and demonstration of alternative engine advanced technology for use in combat vehicles and other equipment that requires an internal combustion engine as a power source. Emphasis will be placed on developing engines that display the following characteristics: high power density, reduced weight, marine environment compatibility, and high fuel efficiency. The program will also develop and demonstrate innovative and advanced propulsion technology which can reduce the currently dictated installed horsepower requirements of USMC Assault Amphibians.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: not applicable.
2. (U) FY 1992 PROGRAM:
 - a. (U) Draft and submit for approval Non-Acquisition Program Decision Document (NAPDD) for Advanced Propulsion Technology ATD.
 - b. (U) Initiate Advanced Engine Technology ATD utilizing turbo-charged MTU-Ka502 engine variant.
 - c. (U) Continue joint development of Turbo-Roto-Compound (TRC) engine.
3. (U) FY 1993 PLANS:
 - a. (U) Transition technology from Technology Base exploratory development.
 - b. (U) Initiate Advanced Propulsion Technology ATD incorporating technologies from Advanced Engine ATD.
 - c. (U) Install 2200 hp MTU-Ka502 engine into testbed vehicle, initiate testing.
 - d. (U) Begin installation of Crypto-Pulse Propulsor (CPP) into High Water Speed Technology Demonstrator (HWSTD).
4. (U) PROGRAM TO COMPLETION: This program completes in FY 1995.

E. (U) WORK PERFORMED BY: IN-HOUSE: MARCORSYSCOM, Quantico, VA; David Taylor Research Center (DTRC), Bethesda, MD; CONTRACTORS: MTU Corp., Friedrichshafen, FRG; Detroit Diesel, Detroit, MI.; Tracor Hydraulics, Laurel, MD; Solar Turbines, San Diego, CA.

F. (U) RELATED ACTIVITIES: Program Element 0603005A, Combat Vehicle and Automotive Advanced Technology, U.S. Army Advanced Integrated Propulsion System (AIPS) program M1A1 tank. This program adheres to Tri-service Reliance agreements.

G. (U) OTHER APPROPRIATION FUNDS: None.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603654N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Joint Service Explosive Ordnance Disposal Development
(Advanced)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0377	Explosive Ordnance Disposal Procedures	4,770	5,113	6,113	CONT.	CONT.
S1317	Explosive Ordnance Disposal Diving Systems	4,037	3,069	3,406	CONT.	CONT.
	TOTAL	8,807	8,182	9,519		

B. (U) DESCRIPTION: This is a Joint Service Program. Provides for the development of Explosives Ordnance Disposal tools and equipment for use by all military services. The responsibility is assigned to the Navy as single service manager, by Department of Defense Directive S160.62 of 26 April 1989, for management of the Joint Service Explosive Ordnance Disposal Research and Development Program. Increasing types of foreign and domestic weapons necessitate a continuing development program to provide Explosive Ordnance Disposal personnel of all military services with the special equipment and tools required to support this mission. This program also provides life support related equipment necessary to support the performance of Navy Explosive Ordnance Disposal tasks underwater. This equipment must have inherently low acoustic and magnetic signatures in order to allow the Explosive Ordnance Disposal technician to safely approach, render safe and dispose of sea mines and other underwater ordnance.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603654N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Joint Service Explosive Ordnance Disposal Dev (Adv)
PROJECT NUMBER: 81317 PROJECT TITLE: Explosive Ordnance Disposal Diving Sys

C. (U) DESCRIPTION: Development of diving equipment and explosive charges to support Explosive Ordnance Disposal (EOD) underwater operation. The equipment must have inherently low acoustic and magnetic signatures in order to allow the EOD technician to safely approach, render safe, and dispose sea mines and other underwater ordnance.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Began OPEVAL on the Chemical Warfare Protective Dive Suit and the MK-98 Neutralization Charge.

b. (U) Began certification testing for Emergency Breathing System (EBS).

2. (U) FY 1992 PROGRAM:

a. (U) Complete TECHEVAL and OPEVAL and receive approval for production (AFP) for the Chemical Warfare Dive Protection Suit.

b. (U) Start TECHEVAL for the EX19 Underwater Breathing Apparatus

c. (U) Complete certification testing for the EBS.

d. (U) Conduct studies of maximum percentage of oxygen in the breathing medium can be provided to a diver during dives to 300 feet.

3. (U) FY 1993 Plans:

a. (U) Start TECHEVAL for the Forward Looking Sonar and Active Thermal Protection.

b. (U) Receive approval for Navy use of Emergency Breathing System.

c. (U) Develop a Non-magnetic lifting balloon system capable to depths of 300 feet.

d. (U) Complete TECHEVAL/OPEVAL and receive AFP for the MK-98 Neutralization Charge.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NCSC, Panama City, FL; NSWC, White Oak, MD; NOS, Louisville, TN; Naval BOOTC, Indian Head, MD; NEDU, Panama City, FL.; NMWEA, Yorktown, VA. CONTRACTORS: Texas Research Institute, Inc., Austin, TX; Kappler Industries, Huntsville, AL; Applied Physics Laboratory, University of Washington, Seattle, WA; AEROSPACE Design Inc, Carson, CA; Carleton Technologies Inc, Tampa, FL.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT (OPN) #36	744	1,011	1,671	CONT.	CONT.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603654N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Joint Service Explosive Ordnance Disposal Dev (Adv)
PROJECT NUMBER: S0377 PROJECT TITLE: Explosive Ordnance Disposal Procedures

C. (U) DESCRIPTION: Provide Explosive Ordnance Disposal personnel of all military services with the specialized equipment and tools required to support their mission of detection, location, identification, rendering safe, recovery, field and laboratory evaluation, and final disposal of nuclear, conventional, chemical, and biological munitions, including improvised explosive devices.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:
 - a. Received approval for production of MK 2 Mod 0 Remote Controlled EOD Tool and Equipment Transporter (RCT), formerly ROVER.
 - b. Completed development testing on MK 29 Mod 0 All Metals Locator and EX 50 Mod 0 Remote Controlled Reconnaissance Motor (RECORM).
2. (U) FY 1992 PROGRAM:
 - a. Approval for production for MK 29 Mod 0 All Metals Locator.
 - b. Complete operational testing on RECORM and Diver Acoustic Navigation System (DANS).
 - c. Initiate Mobile Ordnance Disruption System (MODs) program.
3. (U) FY 1993 PLANS:
 - a. Obtain Approval for Production for DANS and RECORM.
 - b. Initiate Expendable Dearthier, Remote Firing Device, and Limpet Disrupter.
 - c. Obtain Milestone II decision for Remotely Operated Neutralization Device (ROND).
4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: Naval EODTC, Indian Head, MD.
CONTRACTORS: Datasonic, Inc., Cataumet, MA; Battelle-PNL, Richland, WA; Battelle-Columbus, OH; SPARTA INC, Huntsville, AL.

F. (U) RELATED ACTIVITIES: PE 0602315N, Mine and Special Warfare Technology, provides for the development of new technologies which show promise and the transition to advanced development. PE 0604654N, Joint Service Explosive Ordnance Disposal Development (Engineering), provides for the integration of specialized tools and equipment into specified procedures required for individual weapons and ordnance items.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT					
(OPN) #191	2,000	294	975	CONT.	CONT.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603656N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Advanced Minor Caliber Gun

PROJECT NUMBER: S2038

PROJECT TITLE: Advanced Minor Caliber Gun

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1991 ACTUAL	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S2038	ADVANCED MINOR CALIBER GUN	5,412	2,500	3,836	CONT	CONT

B. (U) DESCRIPTION: The Advanced Minor Caliber Gun System (AMCGS), Operational Requirement #243-03-92, will be a stabilized, non-deck penetrating, 25mm-35mm gun system capable of operating in local or remote modes. The AMCGS, a Non-Developmental Item (NDI) - Based Acquisition, will provide to surface ships the capability to defend themselves in a low intensity conflict (i.e., Persian Gulf) against small, high speed surface targets and low, slow speed air targets.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:
 - a. (U) Initiated Program Planning/Integrated Logistics Support (ILS) Program.
 - b. (U) Initiated System Safety Program.
 - c. (U) Held Pre-Solicitation Conference.
 - d. (U) Tasked/Organized Field Support Team.
 - e. (U) Trained Test Team & Initiated TEMP.
 - f. (U) Conducted Lethality Testing.
2. (U) FY 1992 PROGRAM:
 - a. (U) Continue lethality testing
 - b. (U) Perform Cost & Operational Effectiveness Analysis.
 - c. (U) Complete Milestone II Requirements
 - d. (U) Issue RFP
 - e. (U) Review Proposals
3. (U) FY 1993 PLANS:
 - a. (U) Award Multiple Contracts
 - b. (U) Conduct landbased and at-sea-testing of multiple systems utilizing field support.
 - c. (U) Complete source selection process of multiple systems.
 - d. (U) Conduct TECHEVAL/OPEVAL of selected systems.
4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NOS, Louisville, KY; NSWC, Dahlgren, VA; NSWC, Crane, IN. CONTRACTORS: TED

E. (U) RELATED ACTIVITIES: P.E. 0604602N, Naval Gunnery Improvements

F. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

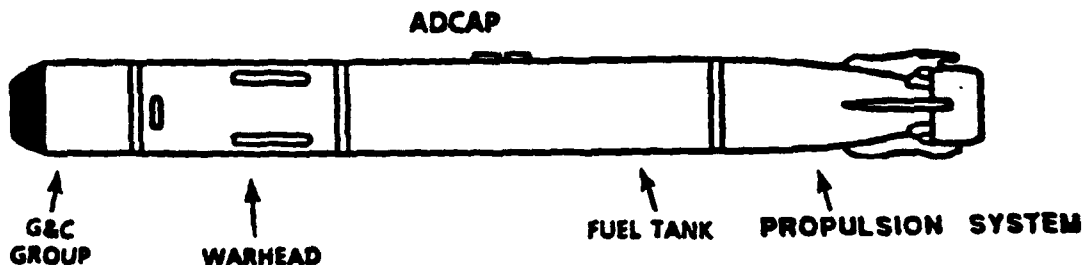
PROGRAM ELEMENT: 0603691N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: MK48 ADCAP Advanced Development

PROJECT NUMBER: F0366

PROJECT TITLE: MK48 Advanced Capability



POPULAR NAME: MK48 ADCAP

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	TO COMPLETE
PROGRAM				
MILESTONES				
ENGINEERING			APU PDR	
MILESTONES			(JAN)	CONT
T&E	G&C OT-IIIA		G&C OT-IIIB	
MILESTONES	(JAN)		(JAN)	CONT
CONTRACT		APU PROTOTYPE		
MILESTONES		CONTRACT AWARD (JUL)		CONT
BUDGET (\$K)	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
MAJOR	5,798	1,092	6,854	CONT
CONTRACT				
SUPPORT	94	85	122	CONT
CONTRACT				
IN-HOUSE	32,916	9,320	15,559	CONT
SUPPORT				
GFE/	20,423	4,190	7,018	CONT
OTHER				
TOTAL	59,231	14,687	29,553	CONT
				CONTINUING PROGRAM

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603691N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: MK48 ADCAP Advanced Development
PROJECT NUMBER: P0366 **PROJECT TITLE:** MK48 Advanced Capability

B. (U) DESCRIPTION: The MK 48 ADCAP torpedo R&D program focuses on three specific areas: the biennial Guidance and Control (G&C) software block upgrades, the ADCAP Propulsion Upgrade (APU) and Lethality Improvements.

In addition, this effort will be used to correct any deficiencies identified during the MK 48 ADCAP Follow-On Test and Evaluation program.

The ADCAP Warhead Lethality Improvement Program is required to improve ADCAP kill performance against advanced submarines.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:
 - a. (U) Completed Special Initiatives Assessment.
 - b. (U) Completed G&C Software Block I and started G&C Software Block II Improvement Program.
 - c. (U) Commenced Lethality Improvement Program.
2. (U) FY 1992 PROGRAM:
 - a. (U) Conduct APU component testing.
 - b. (U) Continue G&C Software Block II Improvement Program.
 - c. (U) Continue Lethality Improvement Program.
 - d. (U) Award contract for APU Prototype Design/Fabrication.
3. (U) FY 1993 PLANS:
 - a. (U) Continue APU component testing.
 - b. (U) Complete G&C Software Block II and start G&C Software Block III Improvement Program.
 - c. (U) Continue Lethality Improvement Program.
4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY:

IN-HOUSE: NUSC, Newport, RI, is the Technical Direction Agent for the program; NUWES, Keyport, WA; NOSC, San Diego, CA; NCSC, Panama City, FL.

CONTRACTORS: Sundstrand, Rockford, IL; ARL/Penn State University, State College, PA; AFL/University of Washington, Seattle, WA; and Hughes Aircraft Company, Fullerton, CA provide engineering support.

E. (U) COMPARISON WITH FY92/3 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: Not Applicable.
2. (U) SCHEDULE CHANGES: Not Applicable.
3. (U) COST CHANGES: FY93: Funding decrease of 33,448K. Program restructured from the Closed Cycle ADCAP Propulsion System (CCAPS) to the ADCAP Propulsion Upgrade (APU).

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603691N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: MK48 Advanced Capability (ADCAP)
PROJECT NUMBER: F0366 PROJECT TITLE: MK48 Advanced Capability

F. (U) PROGRAM DOCUMENTATION:

1. (U) NDCP Rev. 2, dated 9/88, subject "Navy Decision Coordinating Paper (NDCP) for Torpedo MK 48 ADCAP Program."
2. (U) OPNAV TEMP 371 Rev. 3 dated 3/90, subject "Test and Evaluation Master Plan NO. 371 for Torpedo MK48 ADCAP."
3. (U) Operational Requirement 067-02-86, CCAPS, 1/86. Update to APU Operational Requirement Document (ORD) in review process.
4. (U) Operational Requirement 070-02-86, G&C Software, 1/86.
5. (U) Draft TOR for subject: "Improved Submarine Torpedo Warhead" for Warhead Lethality Improvement Program.

G. (U) RELATED ACTIVITIES:

- (PE 0603562N) Submarine Tactical Warfare Systems.
(PE 0604562N) Submarine Tactical Warfare Systems.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT*					
WPN, Item No. 29, (SK)	0	0	0		
APU Procurement Quantities**	0	0	0		

- * Propulsion systems only, not all-up-round torpedoes.
** Propulsion systems projected through the year 2011.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None

J. (U) TEST AND EVALUATION: This information is included in the FY 1993 Congressional Data Sheets.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603702N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Ocean Engineering System Development
PROJECT NUMBER: S0394 PROJECT TITLE: Shallow Depth Diving Equipment

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT UMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0394	Shallow Depth Diving Equipment	2,225	1,639	1,340	Cont.	Cont.

B. (U) DESCRIPTION: This program develops systems to support conventional diver operations from surface platforms to depths of 450 feet. Diver operations include ship husbandry, salvage/recovery and submarine rescue operations to support national as well as Navy needs around the world. Modern certifiable diving systems which ensure diver safety and allow maximum work efficiency will replace currently antiquated systems.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Finalized design of Engineering Development Model and procured most major tooling for future production of Underwater Breathing Apparatus (UBA) MK 19.

b. (U) Completed design and began buying production parts for Full Face Mask (FFM) MK 24.

2. (U) FY 1992 PROGRAM:

a. (U) Complete assembly of six pre-production UBA MK 19's.

b. (U) Perform unmanned testing of breathing resistance, scrubber duration, and oxygen control.

c. (U) Complete TECEVAL of UBA MK 19 and FFM MK 24.

3. (U) FY 1993 PLANS:

a. (U) Perform environmental testing of UBA MK 19 and FFM MK 24.

b. (U) Complete OPEVAL for UBA MK 19 and FFM MK 24.

c. (U) Correct any deficiencies noted in OPEVAL, update documentation, and proceed to Milestone III decision.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Naval Coastal Systems Center, Panama City, FL; Navy Experimental Diving Unit, Panama City FL. CONTRACTORS: Competitive.

E. (U) RELATED ACTIVITIES: PE 0603713N Ocean Eng Tech Dev, PE 1110011N Spec OPS Force Enhancements.

F. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN #35	1,965	1,980	2,100	Cont.	Cont.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: US-France Data Exchange Agreement (N-62-F-190) for exchange of diving information.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603704N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: ASW Oceanography

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0118	Ocean Measurement Sensors	3,619	3,667	3,449	Cont.	Cont.
X1596	Satellite Applications and Technology	4,677	4,710	3,971	Cont.	Cont.
R1987	Mapping, Charting and Geodesy Techniques	1,362	1,419	1,328	Cont.	Cont.
TOTAL		9,658	9,796	8,748		

B. (U) DESCRIPTION: This program develops highly specialized, ultra-high resolution environmental oceanographic instrumentation and techniques to measure acoustic and non-acoustic ocean parameters in support of Fleet operations (Non-Acoustic ASW, Mine Warfare, Special Warfare, Amphibious Warfare). This program also develops techniques to analyze and display the measured environmental data to support ocean survey, ocean reconnaissance and Fleet command requirements for ASW and submarine operations. This program is the principal source of advanced technology for Naval oceanographic survey support to

The Mapping, Charting and Geodesy project will address the bathymetric and gravimetric needs of the Fleet for greater accuracies and densities of geophysical data to support the more advanced weapon systems and navigation systems being introduced to the Fleet. The Satellite Applications and Technology project develops algorithms to process and display remotely sensed satellite data.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603704N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ASW Oceanography
PROJECT NUMBER: R0118 PROJECT TITLE: Ocean Measurement Sensors

C. (U) DESCRIPTION:

Additionally, the project develops instrumentation in response to Fleet specific environmental requirements for amphibious and special warfare.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:
 - a. (U) Completed TSS/NA-16 tow string transition to NAVOCEANO.
 - b. (U) Completed non-acoustic oceanographic survey in Mediterranean with new sensors in conjunction with ONR 6.1 study.
 - c. (U) Incorporated additional environmental sensors into Tactical Oceanographic Monitoring System (TOMS).
 - d. (U) Provided report on SAR/remote ice thickness evaluation.
 2. (U) FY 1992 PROGRAM:
 - a. (U) Complete towed bioluminescence survey system.
 - b. (U) Complete environmental aspects of vorticity sensor.
 - c. (U) Report on Mediterranean non-acoustic phenomena.
 - d. (U) Complete expendable integrated optical sensor package
- (AXKT).
3. (U) FY 1993 PLANS:
 - a. (U) Complete 6.3 aspects of TOMS system for submarine tactical decision aids (TACAIDS).
 - b. (U) Complete expendable bioluminescence sensors.
 - c. (U) Add environmental sensors to drifting buoy units.
 - d. (U) Upgrade tow chain for survey use.
 4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL-SSC, Stennis Space Center, MS (formerly NOARL); NOSC, San Diego, CA. NUSC, Newport, RI. CONTRACTORS: APL/JHU, Laurel, MD; APL/UW, Seattle, WA; Sippican Corp., Marion, MA; UCSB, Santa Barbara, CA; ARETE Corp., Washington, DC; General Dynamics/EBD, Groton, CT.

F. (U) RELATED ACTIVITIES: PE 0602435N, Ocean and Atmospheric Support Technology; PE 0101224N, SSBN Security; PE 0603528N, Non-Acoustic Anti-Submarine Warfare; PE 0604704N, ASW Oceanographic Equipment.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603704N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: ASW Oceanography

PROJECT NUMBER: X1596

PROJECT TITLE: Satellite Applications and Technology

C. (U) DESCRIPTION: This project develops concepts and software techniques for the integration and subsequent application of tactically significant ocean and atmospheric data derived from satellite-borne sensors. Included are techniques and algorithms for the processing of sensor suite measurements, the conversion of raw signal data to geophysical information, analysis schemes for satellite data applications, and field validation of the products. Software is developed for use at Oceanography Centers ashore and for the Tactical Environmental Support System (TESS (3)) afloat. The exploitation of emerging new data sources such as scatterometers and synthetic aperture radars also form an important part of this project. Wherever possible, Expert System and Artificial Intelligence/neural network techniques are incorporated into satellite data processing software and in algorithms to assist in image analysis.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Continued development of altimetry and synthetic aperture radar applications.
- b. (U) Transitioned satellite-derived wind speed measurements to operational use.
- c. (U) Began development of expert system image analysis techniques.
- d. (U) Participated in ICEX-91 and CST-4 acoustic exercises.

2. (U) FY 1992 PROGRAM:

- a. (U) Deliver automated sea-ice algorithms.
- b. (U) Deliver EM/EO sensor performance model.
- c. (U) Deliver cloud classification expert system.
- d. (U) Continue development of altimetry and synthetic aperture radar applications.
- e. (U) Begin development of new satellite application modules for TESS (3).
- f. (U) Participate in CST-6 and ICEX-92 acoustic exercises.

3. (U) FY 1993 PLANS:

- a. (U) Deliver expert system for clear air turbulence.
- b. (U) Begin transition of Synthetic Aperture Radar operational capability.
- c. (U) Deliver automated aerosol analysis model for TESS (3).
- d. (U) Begin expert system for satellite feature analysis.
- e. (U) Begin ambient noise prediction algorithm.
- f. (U) Continue acoustic exercise participation.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL-SSC, Stennis Space Center, MS (formerly NOARL); NRL, Washington, DC. CONTRACTORS: None.

F. (U) RELATED ACTIVITIES: PE 0305111N, Weather Service, provides data base management system; PE 0604230N, Warfare Support Systems, provides satellite algorithms used by TESS (3).

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENT: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603704N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ASW Oceanography
PROJECT NUMBER: R1987 PROJECT TITLE: Mapping, Charting and Geodesy Techniques

C. (U) DESCRIPTION: This project develops new charting, bathymetry, magnetic, and gravimetric survey techniques necessary to reduce the existing 300 shipyear shortfall in accessible, coastal hydrographic survey requirements.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Transitioned coordination for digital products and newsletter.
- b. (U) Investigated variability of bathymetry for interpretation schemes.
- c. (U) Completed coastal optics planner.
- d. (U) Continued weapons system requirements evaluation.

2. (U) FY 1992 PROGRAM:

- a. (U) Continue digital MC&G Analysis and evaluation task.
- b. (U) Complete tidal model and conduct test and evaluation.
- c. (U) Transition Global Positioning System (GPS) Interferometry technology for survey.

3. (U) FY 1993 PLANS:

- a. (U) Continue Digital MC&G Analysis and evaluation task.
- b. (U) Complete Statistical Model on Sea Floor Roughness.
- c. (U) Investigate laser bathymetry techniques.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL-SCC, Stennis Space Center, MS (formerly NOARL); NRL, Washington, DC. CONTRACTORS: Planning Systems, Inc., Slidell, LA; San Diego State University, San Diego, CA; NOAA PMEL, Newport, OR.

F. (U) RELATED ACTIVITIES: PE 0601153N, Defense Research Sciences; PE 0602435N, Ocean and Atmospheric Support Technology; PE 0301327N, Technical Reconnaissance, and Surveillance; PE 0305160N, Defense Meteorological Satellite Program; PE 0603785N, ASW Environmental Acoustic Support.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603706N

BUDGET ACTIVITY: 2

PROGRAM ELEMENT TITLE: Medical Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
M0095	Fleet Health Technology	13,580	11,960	0*	0*	0*
M0096	Fleet Health Standards	4,150	4,148	4,250	Cont.	Cont.
M2022	Bone Marrow Registry	5,904	20,000	0	0	45,508
TOTAL		23,634	36,108	4,250	Cont.	Cont.

* All funds for this project transfer to the Office of the Secretary of Defense for Health Affairs in FY 1993. The project will be reported in PE 0603706D.

B. (U) DESCRIPTION: The Navy Medical Department's mission is the care and treatment of Navy and Marine Corps personnel in operational theaters with the ultimate goals of increased return-to-duty rates, enhanced performance, and reduced morbidity and mortality. Also, medically based standards must be developed to permit the optimal selection of personnel for specific Navy jobs and to ensure the physical readiness and safety of these personnel in the operational environment. Specifically, this program element will support the development of better methods for treating battlefield casualties as well as to develop preventive measures against infectious diseases encountered in military operations abroad. A further objective is to improve the quality of combat personnel by developing validated techniques for medical selection and training, as well as standards and procedures for protecting personnel during exposure to Navy and Marine Corps operational environments. The results of this program will be the identification of the best qualified Navy personnel, improved job and/or task performance, and the reduction of costs attributable to attrition and injury.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603706N

BUDGET ACTIVITY: 2

PROGRAM ELEMENT TITLE: Medical Development

PROJECT NUMBER: M0096

PROJECT TITLE: Fleet Health Standards

C. (U) DESCRIPTION: This project develops medical standards for selection, training, and retention; reduces attrition and injury; and enhances personnel performance in Navy operational environments.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Completed studies of low level lasers on visual search.
- b. (U) Completed development of neutron dosimetry.
- c. (U) Continued work on simulator sickness and spatial awareness.
- d. (U) Continued toxicology-based studies of hazardous chemicals.
- e. (U) Continued studies to improve personnel performance in sustained combat and in cold environments.
- f. (U) Began laser-glare model development.

2. (U) FY 1992 PROGRAM:

- a. (U) Complete toxicology-based studies of hazardous chemicals.
- b. (U) Continue studies to improve personnel performance.
- c. (U) Continue work on simulator sickness and spatial awareness.
- d. (U) Continue laser-glare model development.
- e. (U) Begin studies to relieve G-induced loss of consciousness.

3. (U) FY 1993 PLANS:

- a. (U) Complete studies to improve personnel performance.
- b. (U) Complete work on simulator sickness and spatial awareness.
- c. (U) Begin studies of helmets on neck injuries in high G-turns.
- d. (U) Initiate studies to prevent dehydration in cold water.
- e. (U) Begin studies of advanced toxicologic methods.
- f. (U) Continue laser-glare model development.
- g. (U) Continue studies to relieve G-induced loss of consciousness.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: Naval Aerospace Medical Research Laboratory, Pensacola, FL; Naval Health Research Center, San Diego, CA; Naval Medical Research Institute, Toxicology Detachment, Dayton, OH. CONTRACTORS: None.

F. (U) RELATED ACTIVITIES: This program is coordinated through the Biomedical Research, Sustained Operations, and Aeromedical Research tri-service groups to prevent duplication of effort. Related programs include PE 0603002A, Medical Advanced Technology; and PE 0603231F, Crew Systems Technology.

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603707N

BUDGET ACTIVITY: 2

PROGRAM ELEMENT TITLE: Manpower, Personnel, and Training Advanced Technology Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1991 ACTUAL	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0542*	AIR HFE	1,372	989	1,118	Cont.	Cont.
R1770	M&P SYS	3,170	1,000	3,453	Cont.	Cont.
R1771*	SHIP HFE	1,862	1,865	2,072	Cont.	Cont.
R1772*	ED&TRN	5,916	4,089	6,325	Cont.	Cont.
W1773*	S&T DEV	4,580	5,164	5,490	Cont.	Cont.
	TOTAL	16,900	13,107	18,458	Cont.	Cont.

* These projects were transferred from PE 0603701N, PE 0603720N and PE 0603733N.

B. (U) DESCRIPTION: This Program Element develops and demonstrates advanced concepts in the areas of Manpower, Personnel, and Training. Consistent with FY 1992 Congressional language, it consolidates four program elements into one. There are four broad areas of research:

1. (U) Air and Ship Human Factors Engineering (HFE): These two projects (W0542 and R1771) improve fleet readiness through human factors technology. This technology provides a better fit between the operator, equipment, and mission so that hardware systems will be operated with fewer human-induced errors and with greater safety and maintainability. The objectives of this program are: (1) to improve crew and work station design and evaluation methods so as to reduce errors and increase effectiveness of operations; (2) to establish target-acquisition and weapon-system standards for displays people can understand; (3) to develop airborne tactical decision aids for fleet Air Defense, ASW and strike missions; (4) to provide initial human factors support for new systems; and (5) to improve the integration between platforms and their crews. The projects also develop and evaluate new techniques for human factors based system design.

2. (U) Manpower and Personnel Systems: In view of declining force levels, effective utilization and allocation of human resources is vital. This project improves the utilization and allocation of Navy personnel through the development of simulation models, decision support tools, and enhanced test and measurement techniques. Enabling technologies include mathematical optimization, information systems technology, statistical and econometric forecasting, and human performance and attitude measurement. The results of this project will help the Navy to forecast manning requirements and adjust strength levels without reducing readiness.

3. (U) Education and Training Development: This project improves training effectiveness and reduces training costs by focusing technology on individual training, team training and the retention of complex skills. The project applies automation, instructional and cognitive sciences to training development, delivery, evaluation, and execution.

4. (U) Simulation and Training Devices: This project improves mission effectiveness and safety by applying knowledge about human learning to engineering design of training systems. The project funds proof-of-concept demonstrations of simulators and training technology to improve training and mission rehearsal capability.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603707N

BUDGET ACTIVITY: 2

PROGRAM ELEMENT TITLE: Manpower, Personnel & Training Advanced Technology Development

PROJECT NUMBER: W0542 PROJECT TITLE: Air Human Factors Engineering

C. (U) DESCRIPTION: Develops/demonstrates human factors engineering (HFE) technology for a class of Intelligent Control systems that have broad application in airborne systems (being demonstrated under this Project), shipboard air support systems, and in private sector: Earth resources monitoring; transportation; nuclear and conventional power plant control; and air traffic control. Applies advanced HFE technology to improve human operator & maintainer effectiveness in all Navy airborne weapons systems. Goals: (1) Enhance human performance; (2) Reduce design-induced critical human performance errors; (3) Insert HFE technology into existing and new weapons systems.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Demonstrated Knowledgeable Observation Analysis-Linked Advisory System (KOALAS) for multisensor integration (MSI) in F-14D engineering simulator. Result: 40% increase in lethal range of F-14 air-to-air weapon system. Planned F/A-18 demonstration.

b. (U) Developed pre-prototype KOALAS-based concept for airborne surveillance and antisubmarine warfare applications.

2. (U) FY 1992 PROGRAM:

a. (U) Complete F/A-18 KOALAS demonstrations. Transition to F-14D KOALAS engineering development.

b. (U) Demonstrate technology transfer potential to National Transportation Safety Board (NTSB) and Federal Aviation Administration.

c. (U) Initiate KOALAS Multipatform MSI demonstration Project.

3. (U) FY 1993 PLANS:

a. (U) Transition to F/A-18 KOALAS engineering development. Initiate development and demonstration of common KOALAS components for Multipatform MSI network in F-14D, F/A-18, S-3, E2C (or E-X), and Unmanned Aerial Vehicle (UAV) Common Mission Planning and Control Station (CMPCS).

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NADC, Warminster, PA; NATC, Patuxent River, MD; and NWC, China Lake, CA. CONTRACTORS: JJM Systems, Inc., Ivyland PA; McDonnell Douglas, St Louis; Magnavox, Ft Wayne. Others on competitive procurements.

F. (U) RELATED ACTIVITIES: This program adheres to Tri-Service Reliance Agreements on Training Systems and Manpower & Personnel. Work in this Program Element is related to and fully coordinated with efforts in PE 0603216A, Synthetic Flight Simulator Development and PE 0603227F, Personnel, Training and Simulation Technology.

G. (U) OTHER APPROPRIATION FUNDS: None.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603707N

BUDGET ACTIVITY: 2

PROGRAM ELEMENT TITLE: Manpower, Personnel & Training Advanced Technology Development

PROJECT NUMBER: R1770 PROJECT TITLE: Manpower & Personnel Systems

C. (U) DESCRIPTION: Improves the utilization and allocation of Navy personnel through the development of simulation models, decision-support tools, and enhanced test and measurement techniques. Enabling technologies include mathematical optimization, information systems technology, statistical and econometric forecasting, and human performance and attitude measurement.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Prototyped on-line, interactive enlisted assignment system.
- b. (U) Developed PC-based system for determining and analyzing manpower authorizations at the rating and unit level.
- c. (U) Validated selection standards for six enlisted job categories.

2. (U) FY 1992 PROGRAM:

- a. (U) Complete enlisted community management planning and analysis system prototype.
- b. (U) Test algorithms and methodologies to project end-of-contract populations for use in force projections.
- c. (U) Field test information delivery and decision support system (DSS) for allocating recruiting resources.
- d. (U) Validate analytical methodologies and tools for simulating the effects of joint duty requirements on officer community management.

3. (U) FY 1993 PLANS:

- a. (U) Complete officer allocation and distribution Decision Support System (DSS).
- b. (U) Develop surrogate measures for personal readiness.
- c. (U) Begin development of an interactive system for evaluating impact of changes in combat exclusion on readiness.
- d. (U) Complete development of an officer community management/integrated officer strength planning system.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVPERSRANDCEN, San Diego, CA. CONTRACTORS: Systems Exploration Inc., San Diego, CA; B-K Dynamics, Rockville, MD; Resource Consultants, Inc. Washington, DC; Maxima, San Antonio, TX; AMCI, Inc., Arlington, VA.

F. (U) RELATED ACTIVITIES: This program adheres to Tri-Service Reliance Agreements on Manpower & Personnel. Work in this Program Element is related to and fully coordinated with efforts in PE 0602233N, Mission Support Technology; 0604703M, Personnel, Training, Simulation, and Human Factors; PE 0603732M, Marine Corps Advanced Manpower/ Training Systems; PE 0603007A, Human Factors, Personnel and Training Advanced Technology; and PE 0603227F, Personnel, Training, and Simulation Technology.

G. (U) OTHER APPROPRIATION FUNDS: None.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603707N

BUDGET ACTIVITY: 2

PROGRAM ELEMENT TITLE: Manpower, Personnel & Training Advanced Technology Development

PROJECT NUMBER: R1771 PROJECT TITLE: Ship Human Factors Engineering

C. (U) DESCRIPTION: Improves shipboard and airborne performance by incorporating human engineering into early system acquisition. Thrust areas: (1) tactical information management and decision making (2) multisensor integration (3) decision support systems and (4) advanced visualization displays.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Completed draft functional specs for SLQ-32 replacement console.
- b. (U) Identified expert SLQ-32 operators' management and data integration techniques and incorporated them into software aids and display formats.
- c. (U) Completed analysis of SQY-1 display requirements reducing number of proposed display formats by factor of 4. Will be used in procurement specs.
- d. (U) Developed 3-D visual and aural displays for Advanced Technology ASW Display (ATAD) program.
- e. (U) Incorporated existing ASW display software into ATAD program and wrote software specifications needed for proof of concept application software.
- f. (U) Continued to build and evaluate MILSTAR Operator Job Aid (MORA) software using available off-the-shelf software and hardware.
- g. (U) Started development of the MORA human-computer interface.

2. (U) FY 1992 PROGRAM:

- a. (U) Develop EW display format designs using new operator console.
- b. (U) Develop new integrated display formats and man-machine interface dialogue for Sonar console acquisition program.
- c. (U) Obtain ASW acoustic data for lab simulation and test on ATAD.
- d. (U) Develop sensor to display hardware interface required by ATAD man-in-the-loop tests.
- e. (U) Complete MORA prototype and conduct tests on USS Coronado.
- f. (U) Complete MORA specs, users manuals, and training manuals.

3. (U) FY 1993 PLANS:

- a. (U) Complete EW / sonar display formats and incorporate into hardware acquisition specs.
- b. (U) Complete interface of ATAD displays to ASW sensor hardware and test using ASW Commander staff.
- c. (U) Start requirements analysis for Afloat Planner and Tactics Evaluator decision aid program.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN HOUSE: NOSC, San Diego, CA. CONTRACTORS: None.

F. (U) RELATED ACTIVITIES: This program adheres to Tri-Service Reliance Agreements on Training Systems and Manpower & Personnel. Work in this Program Element is related to and fully coordinated with efforts in PE 0602233N, Mission Support Technology; PE 0604703N, Personnel, Training, Simulation and Human Factors; PE 0603216A, Synthetic Flight Simulator Development; and PE 0603227F, Personnel, Training and Simulation Technology.

G. (U) OTHER APPROPRIATION FUNDS: None.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603707N

BUDGET ACTIVITY: 2

PROGRAM ELEMENT TITLE: Manpower, Personnel & Training Advanced Technology Development

PROJECT NUMBER: R1772 PROJECT TITLE: Education and Training Development

C. (U) DESCRIPTION: Improves training effectiveness and reduces training costs by focusing technology on individual training, team training and the maintenance of complex skills. The program applies cognitive technology, virtual environments, artificial intelligence, neural networks, and simulation and modelling to assessing and improving human capabilities related to complex systems.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Completed automated instructional development system and transitioned to Engineering Development.
- b. (U) Completed Career Systems Training Design System for Electronic Warfare Operators and Operations Specialists.
- c. (U) Developed measures of effectiveness for surface combat operators and designed program for making curriculum changes.

2. (U) FY 1992 PROGRAM:

- a. (U) Apply automated decision-making training tools that increase operator's ability to rapidly identify threat signals.
- b. (U) Identify critical ASW tactical decision skills that would benefit from increased graphic instructional technology.
- c. (U) Complete development of gaming computer based instruction and evaluate effectiveness in selected initial skills training.

3. (U) FY 1993 PLANS:

- a. (U) Develop prototype ASW tactics trainer and associated instructor training.
- b. (U) Develop interactive course-ware training system for damage control and evaluate effect on at-sea conflagration exercises.
- c. (U) Modify electronic warfare operator initial skills training systems' content with measures of effectiveness outcomes.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVPERSRANDCEN, San Diego, CA.
CONTRACTORS: Instructional Science and Design, San Diego, CA.; Systems Engineering Associates, San Diego, CA.; San Diego State University, San Diego, CA.

F. (U) RELATED ACTIVITIES: This program adheres to Tri-Service Reliance Agreements on Training Systems and Manpower & Personnel. Work in this Program Element is related to and fully coordinated with efforts in PE 0604722S, Education and Training Systems Development; PE 0602233N, Mission Support Technology; PE 0603007A, Human Factors, Personnel, and Training Advanced Technology; and PE 0603227F, Personnel, Training, and Simulation Technology.

G. (U) OTHER APPROPRIATION FUNDS: None.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603707N

BUDGET ACTIVITY: 2

PROGRAM ELEMENT TITLE: Manpower, Personnel & Training Advanced Technology Development

PROJECT NUMBER: W1773 PROJECT TITLE: Simulation & Training Devices

C. (U) DESCRIPTION: Improves mission effectiveness and safety by developing and demonstrating application of knowledge about human learning to engineering design of training systems. Conducts proof-of-concept demonstrations of simulators and training technology to improve training and mission rehearsal capability.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Demonstrated 3 components of a Forward Deployable Aviation Simulator Technology (FAST) strike mission rehearsal device.
- b. (U) Transitioned components of FAST to Universal Threat Simulator System (UTSS) joint program.
- c. (U) Demonstrated modules of advanced aircrew coordination training (ACT) and transitioned technology to NASA and FAA.
- d. (U) Demonstrated reduced instruction set computer (RISC) system for embedded training in shipboard weapons systems.
- e. (U) Planned simulation network system using existing trainers.

2. (U) FY 1992 PROGRAM:

- a. (U) Demonstrate integrated FAST components.
- b. (U) Demonstrate Organic Combat Systems Training Technology (OCSTT) for electronic warfare (EW) operator station.
- c. (U) Begin experiment using battle force hardware and performance measurement criteria on Anti-Air Warfare (AAW) scenarios for embedded training.

3. (U) FY 1993 PLANS:

- a. (U) Complete ACT demonstrations/transition to engineering development.
- b. (U) Continue FAST development/demonstrations. Evaluate integrated FAST mission rehearsal device.
- c. (U) Begin OCSTT EW ship-board developments and demonstrations.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NTSC Orlando, FL; NADC, Warminster, PA; NATC, Patuxent River, MD; Air Force Armstrong Lab/AZ, Williams AFB, AZ. CONTRACTORS: TRACOR Flight Systems, Inc., Santa Monica, CA; Others on competitive procurements.

F. (U) RELATED ACTIVITIES: This program adheres to Tri-Service Reliance Agreements on Training Systems and Manpower & Personnel. Work in this Program Element is related to and fully coordinated with efforts in PE 0603216A, Synthetic Flight Simulator Development and PE 0603227F, Personnel, Training and Simulation Technology.

G. (U) OTHER APPROPRIATION FUNDS: None.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603708N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Anti-Submarine Warfare Signal Processing

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO ESTIMATE	TOTAL COMPLETE PROGRAM
W0490	BEARTRAP	15,478	15,071	16,697	CONT	CONT
S0823	Acoustic Performance Prediction	8,888	9,204	9,249	CONT	CONT
X0821	Advanced Acoustic Processor	3,708	3,287	3,528	CONT	CONT
	TOTAL	28,074	27,562	29,474		

B. (U) DESCRIPTION: The Anti-Submarine Warfare (ASW) Signal Processing program provides for the

for intelligence analysis. The program is responsive to requirements to improve all ASW systems to counter the existing and projected submarine threats and to develop system performance prediction software for all acoustic ASW systems.

(1) The BEARTRAP project is a high technology program providing

platforms.

(U) The Advanced Acoustic Processing project independently evaluates Anti-Submarine Warfare Signal Processing systems aboard tactical air, surface and subsurface platforms. This evaluation is used to reduce redundant development efforts and permits technology transfer among advanced development platform-related signal processing programs.

(U) The Acoustic Performance Prediction project develops computer based, on-board capabilities to provide acoustic system performance predictions and mode selection guidance for all tactical ASW Platforms based on in-situ measurements and environmental data bases. This capability is required as ASW applications are based on knowledge of the effects of current acoustic environmental conditions. This project enables the fleet to obtain the full performance potential of ASW systems by extending threat detection ranges and maximizing overall ASW platform survivability in all geographics areas, including the Arctic.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603708N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare Signal Processing
PROJECT NUMBER: W0490 PROJECT TITLE: BEARTRAP

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO ESTIMATE CONT	TOTAL COMPLETE PROGRAM CONT
W0490	BEARTRAP	15,478	15,071	16,697		

B. (U) DESCRIPTION: In the mission of

Project BEARTRAP has had a major and significant impact upon anti-submarine warfare. This is a result of both the and the developmental research equipment and concepts initiated by BEARTRAP and later introduced into the ASW community. BEARTRAP consists of a combination of developmental and prototype

P-3C aircraft, along with special ASW sensors, post mission processing, calibration equipment, and specially trained personnel. BEARTRAP, incorporating a Rapid Development Capability, developed

either currently utilized by operational units or planned for future systems. BEARTRAP is in a.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Continued multiple fleet wide continued development of

Provide
and

sensor developers.

- b. (U) Completed the design of and initiated the installation, integration and testing of

- c. (U)

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603708N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Anti-Submarine Warfare Signal Processing

PROJECT NUMBER: W0490

PROJECT TITLE: BEARTRAP

d. (U)

begin upon receipt of equipment. , Installation to

e. (U) Completed the design for the installation of

capability for receivers and recorders.

; Added

f. (U) Completed installation of _

2. (U) FY 1992 PROGRAM:

a. (U)

b. (U) Continue installation of new APEX signal processing

c. (U) Procure and initiate

provide, d. (U) Continue redesign of BEARTRAP aircraft (Apex) capabilities to capabilities.

e. (U) Integrate

f. (U) Provide

g. (U) Continue to support at special requests.

sonobuoy program.

3. (U) FY 1993 PLANS:

a. (U) Continue

b. (U) Continue

c. (U) Complete

d. (U) Continue

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603708N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare Signal Processing
PROJECT NUMBER: W0490 **PROJECT TITLE:** BEARTRAP

- e. (U) Initiate development of a
- f. (U) Continue to improve
- 4. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, DC; COMPATWINGSPAC, San Francisco, CA; COMPATWINGSLANT, Jacksonville FL; NADC, Warminster, PA; NATC, Patuxent River, MD; NSWC, White Oak, MD; NAC, Indianapolis, IN; and NOSC, San Diego, CA. **CONTRACTORS:** G. P., TAURIO, Columbia, MD; METRON, Inc., Warminster, PA; Norden Systems, Melville, NY; Sparton Electronics Div., Jackson, MI; and Mitre, Mclean, VA.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

- 1. (U) Technical changes: Initiate development and integration into the APEX display system of a highly operator interactive, high data density display presentation capability using 3-D virtual reality concepts.
- 2. (U) Schedule changes: None
- 3. (U) Cost changes: Increase associated with pricing adjustments primarily for DBOF rates.

F. (U) PROGRAM DOCUMENTATION:
NDCP W0-49-AS 6/20/80
NAFDD 076-095 4/15/86

G. (U) RELATED ACTIVITIES: Program Elements: 0603529N, Advanced ASW Target; 0603553N, Surface ASW; 0604713N, Surface ASW Systems Improvement; 0603691N, MK 48 Advanced Capabilities; 0603610N, Advanced Lightweight Torpedo; 0603254N, Air ASW Adv Sensors; 0604261N, Acoustic Search Sensors; 0604221N, P-3C Mod Program; 0604212N, LAMPS; 0604229N, Carrier Inner zone ASW Halo; 0603792N, Advanced Technology Transition; 0603747N, Advanced Collection Technology.

- H. (U) OTHER APPROPRIATION FUNDS:** Not Applicable
- I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS:** Not Applicable.
- J. (U) MILESTONE SCHEDULE:** Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603708N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare Signal Processing
PROJECT NUMBER: 50823 PROJECT TITLE: Acoustic Performance Prediction (APP)

C. (U) DESCRIPTION: APP develops on-board software capabilities that provide acoustic sensor performance predictions and tactical decision aids for all tactical ASW platforms using in-situ measurements, synoptic data and new/updated environmental data bases. APP enables the full performance potential of complex ASW systems by increasing their detection and tracking performance. Beginning in FY92 the APP program will begin to address non-acoustic systems and selected non-ASW platforms.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:
 - a. (U) Updated/evaluated Laptop Acoustic Prediction System (LAPS).
 - b. (U) Updated/evaluated Surface Ship Advanced Development System.
 - c. (U) Completed two Updates to Submarine Fleet Mission Prgm Library.
 - d. (U) Updated the ASW Tactical Decision Aid (ASWTDA) and evaluated at three Fleet evaluation sites.
2. (U) FY 1992 PROGRAM:
 - a. (U) Complete development/evaluate acoustic reverberation monitor.
 - b. (U) Complete development of ASWTDA for implementation in the Navy Tactical Command System-Afloat (NTCS-A).
 - c. (U) Complete development of improved sensor performance prediction module/Decision Aid for TESS(3A) and the Navy Command Control System Ashore.
 - d. (U) Complete a new Submarine Fleet Mission Program Library (SPMPL) for the next generation computer.
 - e. (U) Define mine warfare prediction/decision aid requirements.
 - f. (U) Begin development of a capability to collect environmental data through the combat system.
 - g. (U) Begin development of a performance prediction and mode selection capability for the AEGIS Radar.
3. (U) FY 1993 PLANS:
 - a. (U) Begin development of a mine warfare prediction decision aid.
 - b. (U) Complete development of prototype combat system environmental data collection capability.
 - c. (U) Update SPMPL to provide expanded automatic data entry.
 - d. (U) Complete development of an initial Integrated Oceanographic Tactical Aid (IOTA) for incorporation in NTCS-A. Evaluate at-sea.
 - e. (U) Complete development of a prototype performance prediction/mode selection capability of the AEGIS radar. Evaluate at-sea.
 - f. (U) Update ASWTDA to include active system performance predictions. Evaluate at-sea.
 - g. (U) Upgrade/evaluate the surface APP Advanced Development Model.
4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NUSC Newport, RI; COMNAVOCEANOCOM, Bay St. Louis, MS; NAVOCEANSYSCEN, San Diego, CA; CONTRACTORS: AET, North Stonington, CT; Sonalysts, Waterford, CT; D.H. Wagner, Sunnyvale, CA.

F. (U) RELATED ACTIVITIES: PE 0604575N, AN/SQS-53C; PE 0604524N, Submarine Combat Systems Development; PE 0604713N, ASW Surface Systems Improvements; PE 0603207N, Tactical Environment Support Systems; PE 0604503N, Submarine Sonar Development; PE 0603504N Submarine ASW Developments (Advanced); PE 0603553N Surface Anti-Submarine Warfare (ASW).

G. (U) OTHER APPROPRIATION FUNDS: Not applicable

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603708N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Anti-Submarine Warfare Signal Processing
PROJECT NUMBER: X0821 **PROJECT TITLE:** Advanced Acoustic Processing

C. (U) DESCRIPTION: The Advanced Acoustic Processing project independently evaluates anti-submarine warfare acoustic signal and post processing systems aboard tactical air, surface and subsurface platforms. Reduces redundant development efforts and facilitates technology transfer among advanced development, platform-related signal processing programs.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. **(U) FY 1991 ACCOMPLISHMENTS:** Initiated development of recording/playback systems for the AN/SQS-53 which will playback acoustic signals into an AN/SQS-53 sonar. Collected active sonar echoes, reverberation and ambient noise in conjunction with the SHAREM program. Continued Recognition Differential (RD) measurement of P-3C Update III, AN/SQR-19, AN/BQQ-5C, SSTD, S-3B, SURTASS, including training. Completed testing of broadband sonobuoy and towed array systems. Initiated preparation of test tapes for the Airborne AIS system against conventional signals.

2. **(U) FY 1992 PROGRAM:** Measure RD for the following systems for performance against full spectrum signals: SURTASS, AN/SQR-19, AN/BQQ-5C, P-3C Update IV. Complete AN/SQS-53 record/reproduce system which will playback on an AN/SQS-53. Continue data collection of SQS-53 echoes in conjunction with SHAREM. SSTD preliminary test report. Initiate testing of Airborne AIS system for conventional signals.

3. **(U) FY 1993 PLANS:** Initiate RD measurement of the following systems improved for full spectrum signals: S-3B, P-3C Update 3 CHEX, P-3C Update 4. Initiate RD testing of AN/SQS-53 sonar. Continue testing of Airborne AIS, Phase I. Prepare test tapes for Airborne AIS against full spectrum signals.

4. **(U) PROGRAM TO COMPLETION:** This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NSWC, White Oak, MD.
CONTRACTORS: TRW Systems, McLean, VA (Lead Contractor).

F. (U) RELATED ACTIVITIES: 0604503N, Submarine Sonar Development; 0604219N, Airborne Anti-Submarine Warfare Development; 0604524N, Submarine Advanced

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603709N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Advanced Marine Biological Systems
PROJECT NUMBER: S0214 PROJECT TITLE: Advanced Marine Biological Systems

A. (U) RESOURCES: (Dollars in thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0214	Advanced Marine Biological Systems	5,636	4,804	4,731	CONT.	CONT.

B. (U) DESCRIPTION: This program funds training of marine mammals to determine military worth and optimum utility.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:
 - a. (U) Concluded MK 4 Marine Mammal Systems (MMS) development, which is a highly deployable system to counter
 - b. (U) Continued MK 7 MMS enhancement program to extend

c. (U) Continued MK 7/MK 4 MMS enhancement program to allow for

2. (U) FY 1992 Program:

- a. (U) Fleet introduce MK 4 MMS, providing
- b. (U) Provide Fleet with limited operational capabilities to
- c. (U) Provide fleet with limited operational capability to

3. (U) FY 1993 Plans:

- a. (U) Continue development of MK 7/MK 4 MMS

4. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Naval Ocean Systems Center, Kailua, HI and San Diego, CA. CONTRACTORS: B-K Dynamics; Maritime Services, Kailua, HI.

E. (U) RELATED ACTIVITIES: PE 0602315N, Mine & Special Warfare Technology

F. (U) OTHER APPROPRIATION FUNDS:

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT					
OPN #191	1,380	3,262	3,000	CONT.	CONT.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603711N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Fleet Tactical Development and Evaluation Program
PROJECT NUMBER: R0138 PROJECT TITLE: Tactical Development Support

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE Cont.	TOTAL PROGRAM Cont.
R0138	Tactical Development Support	7,093	6,107	5,628		

B. (U) DESCRIPTION: This Program Element funds the Navy's system for collection, reconstruction and analysis of Fleet operational data elements during exercise and real-world operational events in order to evaluate existing tactics and develop new tactics.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) 12 Tactical Information Management System (TIMS) data collection systems supported 100+ Fleet commands data reconstruction/analysis of 190+ Fleet exercises, operations and tactics projects.
- b. (U) Performed 170+ installations and removals of data collection equipments aboard fleet units.
- c. (U) Provided data collection equipments during Desert Shield/Storm for data capture and event reconstruction.

2. (U) FY 1992 PROGRAM:

- a. (U) Continue TIMS/data collection support for 100+ Fleet commands for analysis of 170+ Fleet projects.
- b. (U) Perform 150+ installations/removals of data collection systems in support of 50 Fleet exercises.
- c. (U) Continue TIMS Upgrade hardware/software development in accordance with CNO approved 5 year plan.

3. (U) FY 1993 PLANS:

- a. (U) Continue Fleet exercise, operations and tactics project support using TIMS Shipboard Tactical Information Management Systems (STIMS) equipments and installation and removal of data collection systems.
- b. (U) Continue CNO approved TIMS Upgrade hardware procurement plan.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVTACSUPPACT, Silver Spring, MD.
CONTRACTORS: United Information Systems, Inc, Beltsville, MD; Summit Research Corp., Rockville, MD; Advanced Systems Technicians, Inc, Silver Spring, MD.

E. (U) RELATED ACTIVITIES: Program Element 0605155N, Fleet Tactical Development and Evaluation.

F. (U) OTHER APPROPRIATION FUNDS: Not applicable.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603712N

BUDGET ACTIVITY: 2

PROGRAM ELEMENT TITLE: Generic Logistics R&D Technology Demonstrations

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
T1816	LOGDEV	9,514	9,075	12,162	CONT	CONT
T1884	RAMP	13,600	5,000	0	0	71,203
T1910	LEAD	4,315	0	4,389	CONT	CONT
	TOTAL	27,429	14,075	16,551	CONT	CONT

B. (U) DESCRIPTION: This is a coordinated program to apply advanced technology to logistics needs and problems in order to:

1. (U) Design weapon systems and their support to eliminate requirements for large logistics tails.
2. (U) Reduce the high cost of maintaining weapon systems and improve readiness.
3. (U) Assist program managers with technology to design, deliver, and support weapon systems within shortened development cycles.
4. (U) Reduce weapon system repair downtime and develop innovative logistics support systems for contingency operations.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603712N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Generic Logistics R&D Technology Demonstrations
PROJECT NUMBER: T1816 PROJECT TITLE: Logistics Technology Development
(LOGDEV)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE CONT	TOTAL PROGRAM CONT
T1816	LOGDEV	9,514	9,075	12,162		

B. (U) DESCRIPTION: The purpose of the LOGDEV project is to improve weapons systems readiness and supportability through development of advanced logistics technology. The project provides for advanced technology development to reduce the weapon system logistics tail; shorten weapon system design, delivery, and support cycles; reduce cost of weapon system acquisition and maintenance; and improve weapons system reliability. Initiatives are expected to be long term, risk reducing, high payoff efforts.

(U) The Standard Hardware Acquisition and Reliability Program (SHARP), a major task within LOGDEV, is a hardware standardization project to reduce the development, production and support cost of military electronic weapon systems, while increasing the reliability and readiness of these systems. SHARP develops multi-system, advanced electronic hardware standards to provide proven quality and reliability for new systems and existing systems modifications. SHARP specifies Standard Electronic Modules (SEM), Standard Power Supplies (SPS), Standard Batteries Systems (SBS), and Standard Enclosures Systems (SES). The standards are used in multiple electronic systems, thus saving the cost of unique designs and reducing production and support costs. SHARP transitions advanced technology into fleet electronic systems, such as Very High Speed Integrated Circuit (VHSIC) technology, thermal management, composites, and photonics to increase readiness and operational availability.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Documented Navy development cost avoidance of \$51,000,000 through the new applications of SHARP developed and specified standards.
- b. (U) Initiated development of 26 new SEM, three new SPS, one new avionics SES, and four new SBS for multiple systems applications.
- c. (U) Tested and evaluated critical fiber optic components (connectors, backplanes and termini) and application of multichip packages to electronics card assemblies.

2. (U) FY 1992 PROGRAM:

- a. (U) Initiate development of 25 new SEM, two new shipboard and six airborne SPS, three SBS, and one SES.
- b. (U) Develop and certify one fiber optic module connector.
- c. (U) Test and evaluate critical fiber optic components.
- d. (U) Evaluate solderless electronics packaging techniques.
- e. (U) Evaluate application of chip on board packaging for advanced electronic card assemblies.
- f. (U) Demonstrate improved battery reliability and supportability.
- g. (U) Continue tri-service coordination of standard hardware.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603712N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Generic Logistics R&D Technology Demonstrations
PROJECT NUMBER: T1816 PROJECT TITLE: Logistics Technology Development
(LOGDEV)

3. (U) FY 1993 PLANS:

- a. (U) Initiate development of 25 new SEM; two new shipboard power supplies; three new batteries; one new standard enclosure.
- b. (U) Develop and certify one fiber optic module connector.
- c. (U) Test and evaluate critical fiber optic components.
- d. (U) Continue to evaluate solderless electronics packaging techniques.
- e. (U) Continue to evaluate advanced technologies and techniques, such as thermal management, VHSIC and composites.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAVIONICCEN, Indianapolis, IN and NAVWPNSUPPCEN, Crane, IN. CONTRACTORS: Numerous small contracts.

E. (U) COMPARISON WITH FY 1992/93 PRESIDENT'S BUDGET:

1. (U) Technology Changes: None.
2. (U) Schedule Changes: None.
3. (U) Cost Changes: In FY 1993, \$1,464,000 added for pricing adjustments primarily related to DBOF increases.

F. (U) PROGRAM DOCUMENTATION: NAPDD approved July 1991.

G. (U) RELATED ACTIVITIES: Tri-Service coordination is provided by the Joint Aeronautic Commander Group (JACG). By JACG Memorandum of Agreement, the Navy is leading efforts for battery standardization/technology insertion. Work in this Program Element is related to and transitions work done in PE 0602234N, Systems Support Technology (Materials).

H. (U) OTHER APPROPRIATION FUNDS: None.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603712N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Generic Logistics R&D Technology Demonstrations
PROJECT NUMBER: T1910 PROJECT TITLE: Logistics Engineering Advanced
Demonstrations (LEAD)

C. (U) DESCRIPTION: The purpose of the LEAD project is to perform near term logistics technology demonstrations to reduce risk of technologies with a potentially large payoff. The project demonstrates concepts and methods that will increase the effectiveness, efficiency, and affordability of logistics support systems, and contribute to a reduction in life cycle costs of weapons systems and equipment. These are expected to be short term logistics projects. The Integrated Diagnostic Support System (IDSS) is a LEAD effort that develops and demonstrates an integrated set of diagnostic tools which improve weapon system testability and improve shipboard capability for trouble shooting of system failures. IDSS provides a design / logistics interface to reduce weapon system life cycle costs and logistics dependency.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:
 - a. (U) Held the Critical Design Review for the Feedback Analyzer tool.
 - b. (U) Completed the Acceptance Test Procedure of the Adaptive Diagnostic Authoring tool.
 - c. (U) Defined system-level data interfaces.
 - d. (U) Completed software tool integration for three tools.
2. (U) FY 1992 PROGRAM: (Funded by OSD in the CALS account)
3. (U) FY 1993 PLANS:
 - a. (U) Complete the IDSS system level demonstration. (Initiation of IDSS funded in FY 1992)
 - b. (U) Develop real-time equipment performance, prognostication and diagnostic capabilities.
 - c. (U) Initiate laboratory and shipboard prognostication performance evaluation on two representative weapons systems.
 - d. (U) Develop methodology for assessing the affordability of advance maintenance technologies.
4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVSWC, Dahlgren, VA; NUSC, Newport, RI.
CONTRACTORS: Harris Corp./GSSD, Syosset, NY; GAI, Sparta, NJ

F. (U) RELATED ACTIVITIES: None.

G. (U) OTHER APPROPRIATION FUNDS: None.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603713N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Ocean Engineering Technology Developments

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
M0099	Deep Submergence Biomedical Development	6,588	6,582	6,472	CONT.	CONT.
F0396	Deep Depth Diving	8	0	0	0	5893
F0397	Deep Ocean Technology	7,349	8,898	6,117	CONT.	CONT.
	TOTAL	13,945	15,480	12,589		

B. (U) DESCRIPTION: Developments in this program will enable the U.S. Navy to overcome deficiencies which constrain deep ocean operations in the areas of search, location, rescue, recovery, salvage, underwater construction, and protection of offshore assets. This program develops the medical technology, diver life support equipment and the vehicles, systems and tools to permit manned and unmanned underwater operations to depths of 20,000 feet (98% of the ocean bottom).

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603713N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Ocean Engineering Technology Developments

PROJECT NUMBER: F0397

PROJECT TITLE: Deep Ocean Technology

C. (U) DESCRIPTION: The objective of this project is to identify and develop critical vehicle technologies required for the Navy to function effectively in the deep ocean environment to depths of 20,000 feet. Current program is developing (1) an Advanced Tethered Vehicle (ATV) equipped with manipulators, TV, and propulsion capable of performing work functions at depths to 20,000 feet; and (2) an Advanced Unmanned Search System (AUSS) equipped with side look sonar, forward look sonar, and TV capable of conducting autonomous bottom searches to depths of 20,000 feet. Also, this program is developing ceramic pressure hulls for unmanned vehicles. The latter was initiated by congressional direction.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Completed development testing of ATV, which included dives to greater than 20,000 feet.
- b. (U) Completed ATV documentation required for fleet turnover.
- c. (U) Completed upgrade of AUSS search sensors.
- d. (U) Completed data suppression/compression program for AUSS to allow near real time acoustic (TV and sonar) transmission through water column.

2. (U) FY 1992 PROGRAM:

- a. (U) Initiate ceramic pressure hull development.
- b. (U) Complete operational evaluation of ATV and turn system over to fleet for operation.
- c. (U) Complete demonstration and validation (DEV) testing of AUSS.
- d. (U) Conduct Milestone II for AUSS.

3. (U) FY 1993 PLANS:

- a. (U) Initiate operational performance testing of AUSS.
- b. (U) Conduct reliability testing against AUSS baseline. Prepare logistics support documentation.
- c. (U) Continue ceramic pressure hull development.
- d. (U) Conduct development of autonomous vehicle work system (electric manipulators).

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: David Taylor Research Center, Bethesda, MD; Naval Ocean Systems Center, San Diego, CA. CONTRACTORS: Various Competitive contracts.

F. (U) RELATED ACTIVITIES: PE 0603702N Ocean Engineering Systems Development; PE 0604559N Deep Submergence Technology.

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603713N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Ocean Engineering Technology Development

PROJECT NUMBER: M0099 PROJECT TITLE: Deep Submergence Biomedical Development

C. (U) DESCRIPTION: Develops biomedical technology to increase diver safety & effectiveness for current operations; supports deeper, longer, safer dives.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Wrote new diet & hydration guidelines for cold strenuous dives.
- b. (U) Delivered new mixed gas diving tables & procedures to NAVSEA.
- c. (U) Wrote interim medical recommendations for submarine rescue.
- d. (U) Evaluated alternative intermittent oxygen (O₂) exposure doses.

2. (U) FY 1992 PROGRAM:

- a. (U) Deliver risk-based air & N₂/O₂ decompression tables to NAVSEA.
- b. (U) Deliver diver thermal-garment selection criteria to NAVSEA.
- c. (U) Deliver updated diver training & work schedules to NAVSEA.
- d. (U) Validate models to predict diver performance based on

underwater breathing gear specifications.

3. (U) FY 1993 PLANS:

- a. (U) Deliver risk-based, surface-supplied, mixed gas decompression tables to NAVSEA.
- b. (U) Publish improved diver's saturation excursion and decompression model.
- c. (U) Provide engineering guidance for location of active heating and passive insulation in diving suits.
- d. (U) Describe quantitative effects of swim stroke and gear on diver efficiency.
- e. (U) Deliver interim guidance for drugs to reduce dive dehydration.
- f. (U) Report use of perfluorocarbon emulsions and alternate gases to treat bends.
- g. (U) Report multi-depth risk analysis for human central nervous system O₂ toxicity.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVMEDRSCHINSTITUTE, Bethesda, MD and NAVSUBMEDRSCHLAB, New London, CT. CONTRACTORS: Various universities.

F. (U) RELATED ACTIVITIES: PE 0603722N (Naval Special Warfare) in conjunction with USSOCOM.

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Cooperative Data Exchange Agreements between US, France, UK, Australia, and Canada for the exchange of biomedical information.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603717N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Command and Control Systems

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X1743	C2 Processor	6,828	7,147	5,185	1,828	86,285
X1753	Link 11 Impv	14,570	1,755	980	0	51,184
	TOTAL	21,398	8,902	6,165	1,828	137,469

B. (U) DESCRIPTION: This program element develops the Command and Control Processor (C2P) and Link 11 Improvement (LEI).

(U) The C2P project uses Non-Developmental Item (NDI) acquisition of standard Navy computers (AN/UYK-43) and develops software programs to interface between tactical digital communication systems and selected shipboard processors. The processor will provide translation between TADILs A, C and J and isolate all tactical data link communications equipment, message standards and protocols from tactical information processors. This will provide a flexible capability for rapidly exchanging tactical information using a single universal database for translating various link formats while remaining completely independent of communications equipment and tactical data computing systems.

(U) The Link 11 Improvement Program (LEIP) is made up of several efforts to improve existing computer-to-computer digital radio communications in the HF and UHF radio frequency bands among Combat Direction System (CDS) equipped ships, submarines, aircraft and shore sites. Near term efforts include improvements in interoperability, reliability, and connectivity among users. Expansion of Link 11 use to non-CDS ships and other platforms and sites is included. Data link improvements will allow more effective employment of fleet units by increasing the timeliness, accuracy, and content of tactical data transfer. In order to ensure interoperability, the U.S. is the Lead Technical Nation to the NATO Improved Link Eleven (NILE) Office.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

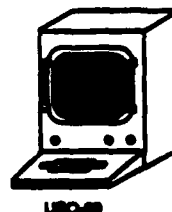
PROGRAM ELEMENT: 0603717N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Command and Control Systems

PROJECT NUMBER: X1743

PROJECT TITLE: Command and Control Processor (C2P)



POPULAR NAME: Command and Control Processor (C2P)

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	TO COMPLETE
PROGRAM	NPDM IIIA	NPDM IIIB		NPDM IIIC
MILESTONES	3/91	6/92		3Q/94
ENGINEERING		GAT(V0) 3/92		
MILESTONES		GAT(V1) 6/92		
T&E	OT-III A	OT-III B		OPEVAL (V0)
MILESTONES	10/90	TRR V1 3/92		1Q/94
CONTRACT				
MILESTONES				
BUDGET (\$000)	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
MAJOR CONTRACT	3,579	4,766	3,244	63,081 (1,328)
SUPPORT CONTRACT	295	306	317	2,182 (0)
IN-HOUSE SUPPORT	1,453	1,497	1,180	11,238 (397)
GFE/OTHER	1,501	578	444	9,784 (103)
TOTAL	6,828	7,147	5,185	86,285 (1,828)

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603717N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Command and Control Systems

PROJECT NUMBER: X1743

PROJECT TITLE: Command and Control Processor (C2P)

B. (U) DESCRIPTION: The Command and Control Processor will remove link translation and processing duties from the tactical data processor, thereby increasing track capacity and target insertion rates for the combat direction system. The C2P will be a newly developed computer program hosted on Navy standard computers (AN/UYK-43) that will serve as the interface between tactical digital communication systems and selected shipboard processors, providing a rapid and flexible capability for exchanging tactical information. Where installed, the C2P will isolate all tactical data link equipment, message standards and protocols from tactical information processors. The C2P provides the interface between Links 4A, 11, Improved Link 11, 16, the Advanced Combat Direction System (ACDS), and AEGIS Command and Decision (C&D). The C2P will extract information from Tactical Digital Information Links (TADILs), translate between TADILs, forward data between specific TADILs and provide the information derived from those links to on-board processors. Information received from shipboard processors will be formatted and provided to the appropriate link equipment for transmission. The C2P program is being developed in two versions. Version 0 will support ACDS Block 0 and AEGIS Model 4 C&D ships. Version 1 will support ACDS Block 1 and AEGIS Model 5 C&D ships.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:
 - a. (U) Complete software coding (Version 0)
2. (U) FY 1992 PROGRAM:
 - a. (U) Conduct initial operational tests (Version 0)
 - b. (U) Complete software coding (Version 1)
 - c. (U) Conduct Government Acceptance Tests (Version 0)
 - d. (U) Conduct Government Acceptance Tests (Version 1)
3. (U) FY 1993 PLANS:
 - a. (U) Conduct multi-ship integration testing (Version 0) at shore based test site
 - b. (U) Complete Technical Evaluation (Version 0)
 - c. (U) Conduct Operational Evaluation (Version 0)
 - d. (U) Conduct multi-ship integration testing (Version 1) at shore based test site
 - e. (U) C2P Version 0 IOC
4. (U) PROGRAM TO COMPLETION:
 - a. (U) Complete Combat System Integration Test (Version 1) (FY-94)

D. (U) WORK PERFORMED BY: IN-HOUSE: FLTCOMBATDIRSSACT, San Diego, CA; NAVOCEANSYSCEN, San Diego, CA; FLTCOMBATDIRSSACT, Dam Neck, VA.
CONTRACTORS: Hughes Aircraft Company, Fullerton, CA.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET

1. (U) TECHNICAL CHANGES: Not Applicable.
2. (U) SCHEDULE CHANGES: C2P Version 0 TECHEVAL/OPEVAL has been rescheduled to coincide with JTIDS TECHEVAL/OPEVAL. ACDS Block 1 schedule delayed thus delaying C2P Version 1 TECHEVAL/OPEVAL.
3. (U) COST CHANGES: Not Applicable.

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FY 1993 ROT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603717N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Command and Control Systems

PROJECT NUMBER: X1743

PROJECT TITLE: Command and Control Processor (C2P)

F. (U) PROGRAM DOCUMENTATION:

1. (U) OR, 12/85
2. (U) NDCP, 2/88 (Revised 11/89)
3. (U) TEMP 357-2, 10/89

G. (U) RELATED ACTIVITIES: Program Element 0205604N, Tactical Information System (JTIDS): LINK 16 is one of the tactical data links currently under development that interfaces with C2P. Program Element 0604518N, CIC Conversion (ACDS): ACDS is the shipboard system currently under development that interfaces with C2P.

H. (U) OTHER APPROPRIATION FUNDS: (Quantity/Dollars in Thousands)

	FY 1991	FY 1992 Actual	FY 1993 Estimate	To Estimate	Total
Complete Program					
(U) PROCUREMENT					
OPN (BA2) (P-1 #83)	8/8,967	10/11,910	9/14,310	Cont.	Cont.
SCN	0/0	5/4,645	5/4,805	Cont.	Cont.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) TEST AND EVALUATION DATA:

On-going C2P Government Acceptance Testing since 1/90; Navy has accepted 3 of 4 planned program builds. Completion of acceptance testing estimated 6/92. C2P V0 land based testing (DT-IIB-1) satisfactorily completed 10/90; DT-IIB-2 started 6/91. Test results not completed. OT-IIA satisfactorily completed 11/90; OT-IIB scheduled for 3/92.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

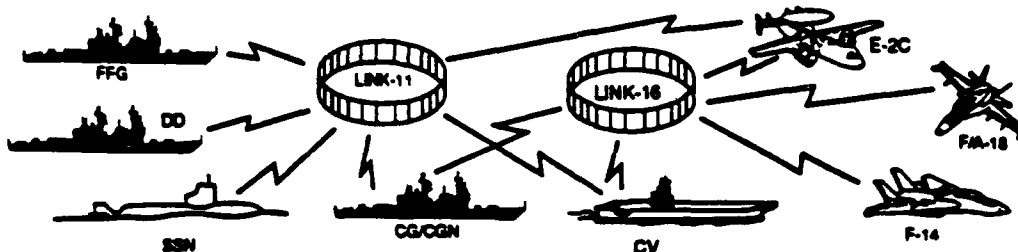
PROGRAM ELEMENT: 0603717N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Command and Control Systems

PROJECT NUMBER: X1753

PROJECT TITLE: Link Eleven Improvement



POPULAR NAME: Link Eleven Improvement Program (LEIP)

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	TO COMPLETE
PROGRAM MILESTONES		LEDS MS II 7/92	LEDS MS III 3/93	FIELD LEDS 2Q/94
ENGINEERING MILESTONES	IANC S/W 9/91	LEDS SPEC 5/92		
T&E MILESTONES	MULTS OF 6/91			
CONTRACT MILESTONES				
BUDGET (\$000)	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
MAJOR CONTRACT	10,206	1,164	300	22,533 0
SUPPORT CONTRACT	191	350	350	5,310 0
IN-HOUSE SUPPORT	3,185	200	300	15,076 0
GFE/OTHER	988	41	30	8,265 0
TOTAL	14,570	1,755	980	51,184

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603717N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Command and Control Systems

PROJECT NUMBER: X1753

PROJECT TITLE: Link Eleven Improvement

B. (U) DESCRIPTION:

(U) The Link-11 Improvement Program (LEIP) is made up of several efforts. These include near term improvements to existing Link-11, technical support of the NATO efforts to develop a long range program for an improved Link-11 system and development of a data link for use with non-Link-11 equipped foreign navies, and a Critical System Demonstration of technologies to improve the performance of current Link-11. LEIP improves existing computer-to-computer digital radio communications in the HF and UHF radio frequency bands among Combat Direction System (CDS) equipped ships, submarines, aircraft and shore sites. Near term improvements include training initiatives (including a Navy Training Plan), upgraded interoperability testing capabilities, diagnostic upgrades, software enhancements for data terminal sets, OPSPEC upgrades for the TDS/CDS, a Link-11 SATCOM project initiative, a Mobile Universal Link Translator System (MULTS), a Link Eleven Display System (LEDS) (including a low cost Link-11 terminal with versions capable of forwarding data) and the Inter-American Naval Conference (IANC) Data Link, "Link America". These data link improvements will allow more effective employment of fleet units by increasing the timeliness, accuracy, and content of tactical data transfer. In order to ensure interoperability, the U.S. is the lead technical nation to the NATO Improved Link Eleven (NILE) office.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Field two MULTS Version 1 prototypes.
- b. (U) Completed partial integration of MULTS unit #3.
- c. (U) Received certification of LEDS software for use in Link-11 operations.
- d. (U) Completed Critical Design Review (CDR) for IANC data link.
- e. (U) Completed land-based integration testing of IANC data link prototype systems in Argentina.
- f. (U) Completed a Critical System Demonstration (CSD) of the Nile (Link-11) Single Tone waveform.
- g. (U) Supported LEDS prototypes deployed on six platforms during Operations Desert Shield and Desert Storm (five Surface Combatants and one Shore Site).
- h. (U) Performed Critical System Demonstration (CSD) of Single Tone Waveform.

2. (U) FY 1992 PROGRAM:

- a. (U) Complete LEDS data forwarding and link diagnostic capabilities.
- b. (U) Conduct certification of MULTS baseline.
- c. (U) Conduct CDR for LEDS.
- d. (U) Continue fielding LEDS upgrades.
- e. (U) Conduct CSD of TDMA Network Protocols.
- f. (U) Conduct CSD of Mission Area Subnet.
- g. (U) Conduct CSD of Multi-Media Protocols.

3. (U) FY 1993 PLANS:

- a. (U) Complete fielding LEDS upgrades.

4. (U) PROGRAM TO COMPLETION: N/A (Program completes in FY 1993)

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVELEXICEN, Portsmouth, VA; NAVOCEANSYSCEN, San Diego, CA; NRL, Washington, D.C.; NTISA, San Diego, CA; NAVELEXACT, St. Inigoes, MD; FLTCOMBATDIRSSACT, Dam Neck, VA.
CONTRACTORS: Applied Physics Laboratory/Johns Hopkins University; TRACOR, California, MD.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603717N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Command and Control Systems

PROJECT NUMBER: X1753

PROJECT TITLE: Link Eleven Improvement

E. (U) COMPARISON WITH REVISED FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: Not Applicable.
2. (U) SCHEDULE CHANGES: Not Applicable.
3. (U) COST CHANGES: Not Applicable.

F. (U) PROGRAM DOCUMENTATION:

1. (U) OR X1327 (LEIP), 2/82
2. (U) DCP (HFAJ/LEIP), 1/87
3. (U) TEMP (HFAJ/LEIP), 1/86

G. (U) RELATED ACTIVITIES: Not Applicable.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
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(U) PROCUREMENT:

OPN (BA2) (P-1 #87)	0	2,142	1,343	0	3,670
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I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS:

1. (U) The NATO Improved Link Eleven (NILE) program is in project definition under an extension to the Memorandum of Understanding effective November 1987. Participating nations include: Canada, France, Italy, Germany, Netherlands, the United Kingdom and the United States.
2. (U) The Inter-American Naval Conference (IANC) includes: Argentina, Bolivia, Brazil, Chile, Ecuador, Mexico, Panama, Paraguay, Peru, Uruguay, Venezuela and the United States.

J. (U) TEST AND EVALUATION DATA: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603721N

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE: ENVIRONMENTAL PROTECTION

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATED	TO COMPLETE	TOTAL PROGRAM
S0400	ORDNANCE RECLAMATION	480	539	656	CONT.	CONT.
S0401	SHIPBOARD WASTE MANAGEMENT	9,089	23,649	26,397	CONT.	CONT.
Y0817	POLLUTION ABATEMENT ASHORE	2,268	1,524	2,005	CONT.	CONT.
T2042	PLASTIC REMOVAL IN MARINE ENVIRONMENT	307	309	154	CONT.	CONT.
	TOTAL	12,144	26,021	29,212		

B. (U) DESCRIPTION: This program develops processes, prototype hardware, systems and operational procedures that will allow the Navy to operate in the U.S., foreign and international waters, air, space, and land areas while complying with U.S. statutes and international agreements and to improve the Navy's response to salvage-related pollution incidents. Projects support the Navy's requirement to meet environmental standards outlined by EPA, Executive Order 12088 of October 1978, and DoD Directive 6050.15 of 14 July 1985 and DoD Directive 6050.9 of 13 February 1989. The technology developed will permit the Navy to comply with present and future regulations in an affordable and cost-effective manner without impairing the military readiness of operational units. The development of effective treatment systems will result in significant cost avoidances as Navy shipboard system will be in compliance with environmental regulations. The program solicits technology from industry, evaluates breadboard units in the laboratory, and develops prototype equipment for technical and operational evaluation in Navy platforms and facilities. Duplication of effort within the Navy and Department of Defense is avoided through close liaison among the Navy system commands and with DoD and other federal agencies. International cooperation and information exchange is achieved with allied nations through direct liaison with NATO-sponsored international symposia.

The FY92-93 program for project S0401 includes RDT&E efforts to allow the Navy to be in compliance with the U.S. Clean Air Act of 1990 with regard to ozone depleting substances. Four major areas of effort are addressed: air conditioning and refrigeration, halons, chlorofluorocarbons (CFC) recovery/recycling and solvents.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603721N

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE: ENVIRONMENTAL PROTECTION

PROJECT NUMBER: S0400

PROJECT TITLE: ORDNANCE RECLAMATION

C. (U) DESCRIPTION: Enabling field activities to comply with environmental laws/standards and provide economically/environmentally acceptable techniques for disposing of the vast amount of ordnance and its energetic contents which is increasing. The preferred method is reclamation, but for those items which are carcinogenic, safe methods of disposal will be developed.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: An automated high pressure waterjet pilot plant for removal of energetic materials from ordnance was tested. Test method has been developed for determining the sensitivity of explosives to waterjet impact and utilized to evaluate the removal PBX loaded munitions items. RDX/HMX solubility studies at ambient and elevated temperatures were initiated to find a replacement for the previously used DMSO which was too hazardous. Los Alamos National Lab performed check out of the Controlled Air Incinerator (CAI). Test equipment and procedures were prepared for the trial burn and NWC China Lake continued development of calibration and air sampling methods for Air Inductively Coupled Plasma spectrometer (AIR-ICP).

2. (U) FY 1992 PROGRAM: Develop plan of action and initiate lab scale recovery/conversion research to determine the most economically/environmentally acceptable approach to PBX and propellant recovery and reuse. Complete lab scale solubility studies at ambient pressures and initiate studies for increased pressure (1 to 5 atmospheres) and use of azeotropic mixtures to facilitate dissolving RDX and HMX. Complete test of CAI and prepare final report on trial burn.

3. (U) FY 1993 PLANS: Complete final report on AIR-ICP spectrometer results and colored flare incineration trial burn. Initiate development of a Fourier Transform Infrared Spectroscopy unit for continuous monitoring of air toxic compounds. Continue propellant reclamation efforts and initiate testing to develop technology to download and recover ingredients from Navy tactical solid rocket motors.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. WORK PERFORMED BY: IN-HOUSE: NWSG, Crane, IN; NWSG, White Oak, MD and NWC, China Lake, CA. CONTRACTORS: Los Alamos National Lab, White Sands, NM.

F. (U) RELATED ACTIVITIES: PE 0603721N - Project Y0817 Pollution Abatement Ashore supported some Controlled Air Incineration work.

G. (U) OTHER APPROPRIATION FUNDS: N/A

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: N/A

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603721N

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE: ENVIRONMENTAL PROTECTION

PROJECT NUMBER: S0401 PROJECT TITLE: SHIPBOARD WASTE MANAGEMENT

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TOTAL COMPLETE	TOTAL PROGRAM
S0401	Shipboard Waste Management	9,089	23,649	26,397	CONT.	CONT.

B. (U) DESCRIPTION: Project develops equipments and procedures for managing all shipboard waste problems. Emphasis is on developing shipboard systems for compliance with national, state, and international regulations and on achieving a pollution-free profile for future ships. This program will also develop conservation and ozone-safe replacement chemical technology for Navy solvents and shipboard refrigeration and firefighting systems.

C. (U) PROGRAM ACCOMPLISHMENTS

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Received initial limited production approval for shipboard vertical trash compactor (SVTC); SHIPEVAL of solid waste pulper (SWP); developed and evaluated four breadboard prototype plastics waste processor (PWP) breadboard prototypes and down selected to two for engineering development model (EDM) development.

b. (U) Developed design package for the high flow oil water separator (HPWS) for CVNs; installed low flow oil water separators (LPWS) aboard fleet YTB, MSO and PB for BOATEVALs and possible TECHEVAL; BOATEVAL of emulsion-breaking oil water separator aboard TWR.

c. (U) LABEVAL membrane greywater treatment systems.

d. (U) Fabricated laser sampling and detection system (LSDS) LABEVAL Off Ship Firefighting System (OSFS); monitor organotin (OT) in selected Navy harbors.

e. (U) LABEVAL ozone-safe CPCs and CPC reclamation system.

2. (U) FY 1992 PROGRAM:

a. (U) Complete development of preproduction prototype (PPP) SWP; development of two EDM PWP designs and initiate LABEVALs and TECHEVALs.

b. (U) Develop package for installation of HCOWS aboard CVN68; conduct BOATEVAL and TECHEVAL of LPWS; investigate potential solutions available from industry for secondary OWS treatment through Broad Agency Announcement (BAA).

c. (U) LABEVAL membrane systems for greywater treatment; design greywater and blackwater treatment systems; investigate potential greywater treatment processes through BAA.

d. (U) Design specification for open-ocean OWS salvage system; LABEVAL LSDS; conduct TECHEVAL and first article test of OSFS; continue OT monitoring at Navy-selected Navy harbors.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603721N

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE: ENVIRONMENTAL PROTECTION

PROJECT NUMBER: 80401 PROJECT TITLE: SHIPBOARD WASTE MANAGEMENT

e. (U) Initiate development of HALON and CFC substitution and conservation technologies to comply with the Montreal Protocol, EPA regulations, DOD Directive 6059.9, OPNAVINST 5090.2 and SECNAVINST 5090.5 and the 1990 Clean Water Act.

f. (U) Evaluate CFC alternatives for air conditioning and refrigerant replacement for ships and aircraft; evaluate replacements for HALON for shipboard and aircraft replacement; continue evaluating refrigerant recycling systems; evaluate alternative solvents; monitor design and fabrication of twin screw AC plant for surface combatants.

3. (U) FY 1993 PLANS:

a. (U) Initiate OPEVAL of SWP; complete LABEVALs and TECHEVALs of the two EDM PWP; develop two PWP PPPs and initiate LABEVALs.

b. (U) Install HCOWS aboard CVN69, conduct SHIPEVAL and initiate TECHEVAL; complete TECHEVAL of LPWS and achieve initial operational capability (IOC); issue contracts to investigate potential secondary OWS treatment systems through BAA process; issue specification for small craft OWS.

c. (U) Design a membrane greywater treatment system; design a EDM SCWO; LABEVAL membrane systems for greywater treatment; issue contract for conceptual evaluation of potential greywater treatment processes through BAA.

d. (U) Continue LABEVAL of LSDs; achieve IOC for the OSFS.

e. (U) Continue evaluation of CFC alternatives for air conditioning and refrigerant replacement for ships and aircraft; SHIPEVAL R12 refrigerant system; develop R114 plant modifications; evaluate replacements for HALON for shipboard and aircraft replacement; conduct aircraft engine nacelle replacement testing; continue evaluating refrigerant recycling systems; evaluate alternative solvents and initiate implementation of non-CFC cleaning alternatives; LABEVAL twin-screw non-CFC AC compressor.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: DTRC, Bethesda, MD; NOSC, San Diego, CA; CONTRACTORS: SCHAT (Pomerooy, CA); NKP (Fairfax, VA); Battelle Pacific Northwest Labs (Richland, WA); SAN-I-PAK (Tracy, CA); Johns Hopkins University (Baltimore, MD); ARTECH (Chantilly, VA); J.J. McMullen (Arlington, VA); Omega Recovery Service (Whittier, CA); GKY & Assoc. (Springfield, VA); PROTECTOR, Inc. (Severna Park, MD); George G. Sharp, Inc. (Arlington, VA); MACI (Washington, DC); MAR (Severna Park, MD); Aspen Systems, Inc. (Marlboro, MA); M. Rosenblatt and Sons, Inc. (Crystal City, VA); Geo-Centers, Inc. (Boston, MA); Advanced Engineering Research Associates, Inc. (Arlington, VA).

E. (U) COMPARISON WITH FY 1992/1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: Not applicable.

3. (U) COST CHANGES: Increase of 1.3M associated with pricing adjustments primarily for DBOP rates.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603721N

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE: ENVIRONMENTAL PROTECTION

PROJECT NUMBER: S0401 PROJECT TITLE: SHIPBOARD WASTE MANAGEMENT

F. (U) PROGRAM DOCUMENTATION

TEMP	067-6 of Dec 87	Small Craft LPOWS
TEMP	067-2 of Feb 81	Advanced Oily Waste Treatment
TEMP	067-1 of Mar 81	Advanced Oily Waste Treatment
TEMP	013-12 of Feb 87	Vertical Trash Compactor
TEMP	013-26 of Apr 88	Solid Waste Pulper
TEMP	013-27 of May 88	Offship Firefighting Systems
NAPDD	May 86	CHT Tank Degreasing
NAPDD	May 86	GRP Soil Drain Evaluation
NAPDD	Oct 88	Advanced Non-Oily Waste Treatment
NAPDD	Oct 88	Advanced Solid Waste Control
NAPDD	May 86	Organotin Waste Treatment
NAPDD	Oct 88	Shipboard Hazardous Waste
NAPDD	Oct 87	Ship Air Emissions/VCCs
OR	273-03-90 of Sep 90	High Efficiency Air Conditioning Plant
OR	274-03-91 of Sep 90	Supplemental Cooling Units
ORD	(Draft) N/A	High Capacity Oil/Water Separator(HCOWS)
ORD	(Draft) N/A	Shipboard Plastics Waste Processor

G. (U) RELATED ACTIVITIES: PE 0602233N Mission Support, PE 0603513 Shipboard System Component Development

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE:

(U) Small Craft LPOWS	2Q93
High Flow OWS	4Q93
Shipboard Vertical Trash Compactor	4Q93
Solid Waste Pulper	4Q93
Offship Firefighting System	1Q93
NAPDDS	Various

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603721N

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE: ENVIRONMENTAL PROTECTION

PROJECT NUMBER: Y0817 PROJECT TITLE: POLLUTION ABATEMENT ASHORE

C. (U) DESCRIPTION: Project develops technologies that will enable the Navy to comply with environmental law, save fiscal resources and reduce liability at shore facilities. The project covers environmental issues in the following areas: aircraft maintenance, fleet operation, hazardous material use, ordnance management and ship repair.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Produced non-chrome aircraft cleaners; confirmed performance of VOC compliant paints; evaluated options for MUSE NOx reduction and large UST leak detection; tested non-chromic acid anodize APFF detection system; improved biomonitoring, lead analyzer and epoxy drinking water liner; evaluated biocatalyzing TNT waste and demo high pressure water ships coatings removal.

2. (U) FY 1992 PROGRAM: Initiate, optimize and transition non-chrome aircraft maintenance technology; evaluate VOC emission controls; test non-point source waste water treatment; complete hand-held lead analyzer, bioassay replacement, and non-point source monitoring methods; transition APFF monitoring; obtain EPA approval of epoxy drinking water pipe lining; prepare test of UST leak detection methods; evaluate pyrotechnic dyes incineration; begin rocket motor scrubber design; continue alternate abrasive blast technology.

3. (U) FY 1993 PLANS: Service demo aircraft chrome replacement technology and flash lamp/dry ice paint removal; design VOC emission control; issue design standards for NPS control and monitoring; transition lead analyzer; begin biomarker technology application; field test drinking water lining, large tank leak detection, rocket motor exhaust scrubber and controlled air incineration of flares; investigate laser/supercritical CO2 for Naval Shipyard cleaning process waste reduction.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED AT: NADC, Warminster, PA; Selected NADPs, NCEL, Port Hueneme, CA; NOSC, San Diego, CA; NRL, Washington, DC; DTRC, Bethesda, MD; NAVSESS; Selected NSY's; NOS, Indian Head, MD; NWSC, Crane, IN; Army and Air Force facilities and various contract and academic providers.

F. (U) RELATED ACTIVITIES: PE 0602233N Mission Support Technology

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603721N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: ENVIRONMENTAL PROTECTION
PROJECT NUMBER: T2042 PROJECT TITLE: PLASTIC REMOVAL IN MARINE ENVIRONMENT

C. (U) DESCRIPTION: This project investigates methods to reduce or eliminate plastic material from items going aboard Navy ships to assist the fleet in complying with Annex V to the International Convention for the Prevention of Pollution from Ships (MARPOL). MARPOL was ratified by Congress and signed into law by the President on 29 December 1987.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Researched materials and processes to reduce the volume of plastic material going aboard Navy ships. Conducted laboratory and fleet testing.

2. (U) FY 1992 PROGRAM: Continue to research and evaluate alternatives to plastics. Implement changes to products and technology as identified.

3. (U) FY 1993 PLANS: Continue to evaluate proposed alternatives to plastics. Implement changes as identified.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, DC; Natick Research and Development Center, Natick, MA; DTRC, Annapolis, MD. CONTRACTORS: To be determined.

F. (U) RELATED ACTIVITIES: PE 0602233N (Mission Support Technology), PE 0602178D (DoD Food Program)

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) O&M,N	1,301	1,300	1,299	Cont.	Cont.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603724N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: NAVY ENERGY PROGRAM (ADV)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COM- PLETE	TOTAL
R0829	ENERGY CONSERVATION (ADV)	3,137	2,791	3,291	Cont.	Cont.
R0838	MOBILITY FUELS (ADV)	<u>4,299</u>	<u>1,887</u>	<u>2,068</u>	<u>Cont.</u>	<u>Cont.</u>
	TOTAL	7,436	4,678	5,359	Cont.	Cont.

B. (U) DESCRIPTION: This program supports projects to evaluate, adapt, and develop energy related technologies for ship, aircraft, and land-based operations to: (a) increase fuel-related weapon systems capabilities such as range and time on station; (b) conserve energy and reduce energy costs; (c) develop a capability to use a wider variety of ship and aircraft fuels without affecting equipment performance or reliability; and (d) reduce Navy shore facilities dependence on petroleum fuels.

This program, and the companion PE 0604710N, Navy Energy Program (Eng), support the achievement of Executive Department, DOD, and Navy Energy Management Goals enunciated in Executive Order 12759 of Apr 91, Defense Energy Policy Memorandum 91-2 of May 91.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603724N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: NAVY ENERGY PROGRAM (ADV)

PROJECT NUMBER: R0829 PROJECT TITLE: Energy Conservation (Advanced)

C. (U) DESCRIPTION: This project improves the energy efficiency of Navy ships, aircraft, and shore facilities and thereby contributes to improved fleet sustainability and performance. Major efforts include work to increase the efficiency of aircraft engines and auxiliary systems, develop improved hull coatings and auxiliary equipment for ships, and evaluate alternate energy sources and energy use management strategies at Navy shore facilities.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- Transitioned F404 engine core efficiency improvements (compressor and turbine technology) to NAVAIR for validation testing in GE23A demonstrator engine.

- Designed pierside "clean steam" technology demonstration unit and developed T&E plan.

- Guided the installation of 500kW of photovoltaics (PV) at 75 sites for FY91 savings of \$2.5M. Developed qualification standards/test procedures for new technology PV modules and components.

- Non-chlorofluorocarbon (non-CFC) refrigerant successfully tested in 80 ton shipboard reciprocating AC plant. Initiated design of replacement impellers to permit testing of non-CFC refrigerants in Navy centrifugal AC plants while minimizing efficiency loss.

- Developed tools for the screening/comparison of advanced anti-foulant (AF) hull paints and agents: minimum effective toxicant release rate apparatus; disk-drag apparatus to measure slime induced drag; ablation rate test; and reliable ablation rate paint matrix. Correlated disk-drag data with full scale powering trial of slimed versus clean destroyer hull.

2. (U) FY 1992 PROGRAM:

- Identify affordable efficiency improvements for high fuel use engines/aircraft: Allison T56, P&W J52, GE F101 engines; F/A-18 airframes with GE F404/F414 engines.

- Initiate facility industrial process energy consumption analyses to identify modernization requirements for efficiency improvement. Conduct developmental testing of "clean steam" prototype.

- Develop test plan for large (>500kW) grid-interactive PV system. Prepare program plan to implement Congressionally mandated 100MW of PV in DOD by 1996.

- Conduct shipboard tests of non-CFC refrigerant in 80 ton AC plants in support of NAVSEA freon replacement program.

- Modify AF paint/agent screening tools to compare the performance of emerging fouling release coatings and paint films containing "non-toxic" analogs of naturally occurring AF agents (systems now in 6.2 development) to current ablative copper paints.

3. (U) FY 1993 PLANS:

- Initiate laboratory testing of non-CFC refrigerants for ship centrifugal AC plants using the modified impellers designed in FY91.

- Continue aircraft propulsion efficiency programs identified as transitionable (cost, risk, schedule) technologies with high payoff.

- Develop energy technology/resource management investment strategies for all Navy facility activities (industrial, office, housing) and for both supply and demand issues. Transition "clean steam" prototype development to 6.4 while completing prototype testing. Field test large grid-interactive Navy PV system.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: DTRC, Annapolis, MD; NADC, Warminster, PA; NAPC, Trenton, NJ; NCEL, Port Hueneme, CA; NWC, China Lake, CA; NOSC, San Diego, CA. CONTRACTORS: General Electric Corp., Evandale, OH and Lynn, MA; Teledyne Inet, Torrance, CA.

F. (U) RELATED ACTIVITIES: PE 0604710N, Navy Energy Program (Eng). Air conditioning programs are closely integrated with PE 0603721N, Environmental Protection, and PE 0603513N, Shipboard Systems Component Development.

G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: N/A

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603724N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: NAVY ENERGY PROGRAM (ADV)

PROJECT NUMBER: R0838 PROJECT TITLE: Mobility Fuels (Advanced)

C. (U) DESCRIPTION: This project is designed to provide data through engine and fuel system tests which relate the effects of changes in Navy fuel procurement specification properties to the performance and reliability of Naval ship and aircraft engines and fuel systems. This information is required to: (a) determine the extent to which unnecessarily restrictive specification features can be relaxed to reduce cost and increase availability worldwide; (b) provide guidance to fleet operators for the safe use of off-specification or commercial grade fuels in emergencies and (c) make needed periodic changes to fuel specifications to ensure fuel quality and avoid fleet operating problems while accommodating evolutionary changes in the fuel supply industry. Products from this project are used to solve immediate fuel-related problems posed by the Defense fuel procurement community, fleet users, and engine/fuel equipment manufacturers. Recent trends in fuel quality have affected ship and aircraft system performance and reliability and resulted in degradation of fuel in storage.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- Recommended a change in the specification to relax the JP-5 (Navy jet fuel) freeze point to increase availability and minimize cost.
- Issued guidance to the fleet to allow the emergency use of F-76 (ship diesel fuel) in the AV-8B when JP-5 is unavailable.
- Evaluated and proved the effectiveness of two new ship diesel fuel long term storage stability additives.

2. (U) FY 1992 Program:

- Complete ship diesel engine durability evaluations and recommend specific specification properties broadened to encompass commercial grade marine gas oils.
- Provide guidelines for the use of metal deactivator additives as jet fuel thermal stability enhancers.
- Develop test to determine long term jet fuel storage stability performance.

3. (U) FY 1993 PLANS:

- Begin performance evaluation of the LM2500 ship gas turbine engine with broadened specification diesel fuels.
- Begin 501-K34 ship turbo-generator engine durability evaluation to finalize diesel fuel trace metal and sulphur specification limits
- Develop the methodology to measure and enhance shipboard jet fuel lubricity and control aircraft fuel system wear.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: DTRC, Annapolis, MD; NAPC, Trenton, NJ; NRL, Washington, DC; NAVSSES, Philadelphia, PA. CONTRACTORS: Allison Gas Turbine, Indianapolis, IN; Detroit Diesel Corp, Detroit, MI; General Electric Corp, Cincinnati, OH; Pratt and Whitney, West Palm Beach, FL; National Institute for Petroleum and Energy Research, Bartlesville, OK.

F. (U) RELATED ACTIVITIES: PE 0602233N, Mission Support Technology.

G. (U) OTHER APPROPRIATION FUNDS: None.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: ABCA/IEP-3 agreement with UK, Canada, and Australia on fuels and allied products.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603725N
PROGRAM ELEMENT TITLE: Facilities Improvement

BUDGET ACTIVITY: 4

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1991 ACTUAL	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
Y0995	Naval Facilities System	215	462	1,594	CONT.	CONT.
Y1606	Naval Const Forces Tech/Tools	800	0	0	0	14,713
TOTAL		1,015	462	1,594	CONT.	CONT.

B. (U) DESCRIPTION: Provides for the development of specification inputs to maintenance, repair and construction acquisition process to reduce the costs of Naval facilities infrastructure through full scale test validation of emerging technology. It addresses Navy-unique mission developments where private development is lacking. The development of the High performance Magazine provides new capability to enable either an 8 fold increase in ordnance storage density or a comparable reduction in the safety encumbered land area to reduce the cost of ordnance storage ashore from ship deactivations and provide cost offset opportunities in base consolidations. It encompasses innovative advanced development of reinforced earth and enhanced concrete (and other materials) construction composites to resist close-in explosion effects. Survivability concepts and weapons effects test data will be monitored and applied. Developments to reduce the costs of unavoidable life extending maintenance and repair consist of: (a) advanced facility condition diagnostics for quantitative rapid measurements for economic condition assessment of facilities, to reduce premature maintenance and to preclude costly emergency actions from sudden failures; and (b) new corrosion/deterioration resistant materials, new manpower/skill efficient methods and sensor-based quality assurance techniques, to increase durability and quality on the waterfront. The products will be non-proprietary specifications for competitive and performance-based procurement of essential maintenance. In addition, this program provides for the development of specialized equipment and techniques to satisfy Navy-unique mission requirements of the Naval Construction Force (Seabees) focused on specialized ocean construction capabilities required to reduce personnel risks and peacetime operating costs and capability deficiencies.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603725N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Facilities Improvement

PROJECT NUMBER: Y0995 PROJECT TITLE: Naval Facilities System

C. (U) DESCRIPTION: Project develops and validates new facility and construction technology concepts and products to mitigate enemy threats, and enable deployment and readiness of fleet systems.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Completed preliminary base vulnerability models and test data. Completed developmental testing of runway bomb crater repair equipment for asphalt. Prepared interim specification and terminated effort.

2. (U) FY 1992 PROGRAM: Initiate constructability assessment of concepts, methods and materials for explosion containment/safety structures i.e. High Performance magazine. Develop facility survivability and weapons effects inputs to the design of tri-Service tests. Assess emerging technology in diagnostics and materials and for development and application to waterfront maintenance cost problems.

3. (U) FY 1993 PLANS: Complete constructability evaluation of High Performance Magazine concepts to include ordnance handling and operations, safety, performance, costs, configurations, and material construction methods. (This in anticipation of full scale prototype development in FY94). Monitor survivability tests for facilities data. Full scale prototype tests of high durability concrete to waterfront repair and construction, to develop specifications for facility life extension at reduced costs.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: Naval Civil Engineering Laboratory, Port Hueneme, CA. CONTRACTORS: CEMCON Research Associates, Lanham, MD; Mission Research Corp, Santa Barbara, CA;

F. (U) RELATED ACTIVITIES: PE 0602233N, Mission Support Technology; PE 0602234N, Systems Support Technology.

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603726N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Merchant Ship Naval Augmentation Program
PROGRAM NUMBER: S0378 PROJECT TITLE: Merchant Ship Naval Auxiliary
Program (MSNAP)

A. (U) RESOURCES (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1991 ACTUAL	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE CONT.	TOTAL PROGRAM CONT.
S0378	MSNAP	0	1,782	1,843		

B. (U) DESCRIPTION: The program requirement enables civilian manned merchant ships to perform tasks in support of the Strategic Sealift Mission. This program develops prototype systems from service approved and commercially available components. The mission areas include port-to-port lift, over-the-shore cargo offload and Underway Replenishment. The elements of the program are to provide new militarily useful capabilities, improve ship performance envelopes and increase crew efficiency through mechanization. These elements are necessary because merchant ships were designed to fill a narrow commercial need with the greatest feasible economy. Their crew sizes are small, machinery installations austere and cargo handling facilities oriented toward offload in a developed port. From FY 1982-86, this R&D program produced the Auxiliary Crane Ship (T-ACS), Seashed Systems, Modular Cargo (MCDS) and Fuel (MFDS) Delivery Systems, Vertical Replenishment (VERTREP) deck, Container Ship Strikeup System, Portable Berthing, Head and Shower Modules, Lighter On Deck Stowage Facility and several other Sealift Enhancement Features. Most Ready Reserve Force (RRF) ships have been affected by the program. (New Start FY 1992)

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Not Applicable.
2. (U) FY 1992 PROGRAM: (New Start)
 - a. (U) Design fire detection/suppression system for container ships.
 - b. (U) Design low-cost vertical cargo lifter.
 - c. (U) Complete container ship crane enhancement system design.
 - d. (U) Begin detail design and fabricate omni-directional handler.
3. (U) FY 1993 PLANS:
 - a. (U) Demonstrate container ship fire detection/suppression system.
 - b. (U) Complete detail design and fabricate vertical cargo lifter.
 - c. (U) Fabricate container ship crane enhancement system.
 - d. (U) Demonstrate omni-directional handler, complete modular between deck design and begin design of integrated container ship Underway Replenishment (UNREP) system.
4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Coastal Systems Station, Panama City, FL; Navy Weapons Handling Center, Colt's Neck, NJ; Naval Ship Weapons Systems Engineering Center, Port Hueneme, CA; NSWC, White Oak, MD. Contractors: TBD.

E. (U) RELATED ACTIVITIES: PE 0603564N Ship Development

F. (U) OTHER APPROPRIATION FUNDS: Not applicable.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603732M BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Marine Corps Advanced Manpower/Training Systems
PROJECT NUMBER: C0073 PROJECT TITLE: Human Resources Management and
Forecasting (HRM&F)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1991 ACTUAL	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C0073	HRM&F	3,066	3,285	3,659	CONT.	CONT.

B. (U) DESCRIPTION: This program funds the advanced development of systems and equipment to improve the manpower readiness of the Fleet Marine Force and develops techniques and methods that advance enlisted and officer occupational assignment, promotions and career track planning in the Marine Corps while end strength is reduced and force structure is changed.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Completed Women Marine Model which allows planning for the numbers of women in the force structure. Optical Digital Imaging (ODI) Strategic Plan completed to reduce records maintenance costs and expedite the process of preparing selection boards. Enlisted Planning System (EPS), Reenlistment Plan Module completed and in full operation.
2. (U) FY 1992 PROGRAM:
 - a. (U) ODI prototype of Temporary Disabled-Retirement List records completed to provide insight into benefits and problems with ODI in application.
 - b. (U) EPS Selective Reenlistment Bonus Module completed.
 - c. (U) Joint Job Performance Measurement (JJPM) electronics repair testing conducted.
3. (U) FY 1993 PLANS:
 - a. (U) Complete ODI prototype for fitness report measurement.
 - b. (U) EPS user interface and Enlisted Bonus Module to be completed.
 - c. (U) Design test for JJPM clerical and administrative composite.
4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Naval Personnel Research and Development Center, San Diego, CA. CONTRACTORS: Computers Sciences Corporation, Falls Church, VA and Dynamic Concepts, Inc., Washington, DC.

E. (U) RELATED ACTIVITIES: This program adheres to Tri-Service Reliance Agreements on Manpower & Personnel, with oversight and coordination provided by the Joint Directors of Laboratories. This program is related to all armed services' human resources management and forecasting efforts, including Program Element (PE) 0603707N, Manpower, Personnel, & Training Advanced Technology Development; PE 0603007A, Human Factors, Personnel, and Training Advanced Technology; and PE 0603227F, Personnel, Training, & Simulation Technology.

F. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603747N

BUDGET ACTIVITY: 2

PROGRAM ELEMENT TITLE: Advanced ASW Technology

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X1933	ASW Advanced Technology Demonstration	5,226	14,880	14,703	CONT.	CONT.
X1959	Critical Sea Tests, Phase II	*	12,971	20,127	64,644	138,128
X2100	Advanced Deployable Array	0	3,997	3,778	14,770	22,545
H2089	Advanced Collection Technology	10,880	10,863	11,058	CONT.	CONT.
TOTAL		16,106	42,711	49,666	CONT.	CONT.

* The Critical Sea Test Project was previously shown in PE 0603792N.

B. U DESCRIPTION:

(U) The objective of this program is to rapidly transition enabling Anti-Submarine Warfare (ASW) technologies to existing and future ASW systems, yielding significant improvements for minimal investment. Due to recent geopolitical changes, this program's focus is shifting to address regional conflict, ASW coordination in the tactical Battle Force, and active systems to more effectively pursue a full range of potential submarine threats.

(U) The Advanced ASW Technology Program proves underwater acoustic concepts through at-sea and field experiments and develops Advanced Collection Technologies (ACT) to support a cross-platform direct measurement program of for potential in the Low Frequency Active (LFA), as well as and passive regimes. This program is also comprised of Full Spectrum processing, advanced sources and active acoustic Critical Sea Tests for. a small coordination effort in ASW Command, Control, Communications and Intelligence (C³I), ASW Advanced Technology, and advanced tactically deployable arrays. The program provides developmental demonstration systems, initial concept testing in the laboratory and at-sea, and specifications for engineering development to field ASW passive and active systems capable of detecting the very quiet nuclear and Air Independent Propulsion (AIP) submarine threats of the The program also demonstrates the exploitation of the environments for ASW operations.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603747N BUDGET ACTIVITY: 2
 PROGRAM ELEMENT TITLE: Advanced ASW Technology
 PROJECT NUMBER: X1933 PROJECT TITLE: ASW Advanced Technology
 Demonstration (ASW ATD)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE CONT.	TOTAL PROGRAM CONT.
X1933	ASW ATD	5,226	14,880	14,703		

B. (U) DESCRIPTION: The Anti-Submarine Warfare (ASW) Advanced Technology Demonstration Project (X1933) includes full spectrum processing development to which have not been exploited with previous processing systems. Current systems are designed to which are being significantly - this Full Spectrum effort is designed to provide for or during specific which either can not be readily or. The portion of this project provides for the transition of the SPINNAKER project, which exploit the relative to Supporting ASW Command, Control, Communications and Intelligence (C'I) advanced source technology development and analyses are included in the project.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:
 - a. (U) Commenced integrated ASW technology validation.
 - b. (U) Full Spectrum Database baseline brought on-line with 30 threat data packages.
 - c. (U) Transitioned two specific full spectrum signal detections to Sound Surveillance System (SOSUS), Fixed Distributed System (FDS), and Surveillance Towed Array Sonar System (SURTASS).
 - d. (U) Transitioned ASW C'I findings to ASW Global Information Exchange System (GLOBIXS).
2. (U) FY 1992 PROGRAM:
 - a. (U) Procure demonstration array components, initiate processor development.
 - b. (U) Conduct Sea Exercises and interim SPINNAKER field measurements.
 - c. (U) Analyze and report sensor performance.
 - d. (U) Continue full spectrum signal processing development for signals and
 - e. (U) Initiate acoustic warfare implementation planning for cross platform/system interoperability in a operational environment.
 - f. (U) Initiate and signal processing development for full spectrum signal detection, tracking and classification using the Full Spectrum Database.
 - g. (U) Test three (3) acoustic source element candidates (Sparker, Thermal, Inverse Flextensional).

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603747N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Advanced ASW Technology
PROJECT NUMBER: X1933 PROJECT TITLE: ASW Advanced Technology
Demonstration (ASW ATD)

3. (U) FY 1993 PLANS:

- a. (U) Deploy demonstration array, including advanced processing from Exploratory Development (6.2) programs and FY 1992 results.
- b. (U) Conduct, and analyze and report results.
- c. (U) Evaluate SPINNAKER options and define transition plan.
- d. (U) Procure and test an array of acoustic sources, utilizing the preferred single-element technology from FY 1992 tests.
- e. (U) Transition successful to current system software modifications, and to developmental development projects.
- f. (U) Complete/deliver Acoustic Warfare Plan to the ASW Master Planning Group, including interoperability and C/I/threat integration.
- g. (U) Initiate full spectrum display and localization processing improvements mid-fiscal year.
- h. (U) Initiate processing tests on full spectrum signals and initiate detection, tracking, and classification, and laboratory testing on full spectrum signals using the Full Spectrum Database.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NOSC, San Diego, CA; NADC, Warminster, PA; NRL, Washington, DC; NSWC, White Oak, MD; NUSC, New London, CT; NAVAIRSYSCOM, Wash. CONTRACTORS: Hughes Aircraft Co., Fullerton, CA; AT&T (Bell Labs), Whippany, NJ; Planning Systems, Inc., McLean, VA; GP Taurio, Jacksonville, FL; E-Systems, Dallas, TX.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: None
2. (U) SCHEDULE CHANGES: None
3. (U) COST CHANGES: None

F. (U) PROGRAM DOCUMENTATION:

(U) NAFDD #053-98	7 Apr 1987
(U) ASW (RD&A) Memo "Distribution of ASW Technology Funds"	21 Dec 1990
(U) , OR	Apr 1990
(U) NAFDD #251-07 for Regional ASW Command Concept	7 Dec 1990

G. (U) RELATED ACTIVITIES: PE 0602314N, Undersea Surveillance and Weapons Technology; and PE 0603792, Advanced Technology Transition. The following programs are the transition target projects awaiting successful output from this project: PE 0603708N, Anti-Submarine Warfare Signal Processing; PE 0204311N, Undersea Surveillance Systems; PE 0204313N, Surveillance Towed Array Sensor System; PE 0604261N, Air ASW; and PE 0603553N, Surface ASW.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603747N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Advanced ASW Technology
PROJECT NUMBER: X1933 PROJECT TITLE: ASW Advanced Technology
Demonstration (ASW ATD)

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS:
negotiations concluded but awaiting resolution of legal issues before
signature.

J. (U) MILESTONE SCHEDULE: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603747N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Advanced ASW Technology
PROJECT NUMBER: X1959 PROJECT TITLE: Critical Sea Tests, Phase II (CST)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X1959	CST		12,971	20,127	64,644	138,128

* The Critical Sea Tests project was previously shown in PE 0603792N.

B. (U) DESCRIPTION: The Critical Sea Tests (CST) project provides a consolidated means of conducting at-sea (both shallow and deep water) active system experiments for Post Cold War regional conflict scenarios in support of all ASW platforms and development programs (DARPA, 6.1, 6.2, 6.3, 6.4, operation and training development). The CST (X1959) Phase II transferred from PE 0603792N in FY 1992 with objectives broadened to emphasize including shallow water. The testing assets of this project are the core of planned

The scientific focus for this project has shifted from deep water ASW detection to critical shallow water issues (in regional conflict scenarios) and acoustic warfare interoperability issues which fleet operators need to address immediately. Reverberation, transmitted waveforms, processing algorithms and operational considerations are evaluated in key at-sea areas of ASW interest, to provide design information and improvements for existing, planned and potential low frequency active systems. Acoustic warfare interoperability testing and operations are part of this investigation.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: This project was previously funded in PE 0603792N.

2. (U) FY 1992 PROGRAM:

- (U) Conducted tests off in combined Air Defense Initiative (ADI)/ASW and CST effort (E1/CST 6) in 1Q FY 1992.
- (U) Conduct combined air/submarine/surface/surveillance ASW sea tests in.

3. (U) FY 1993 PLANS:

- (U) Conduct combined tactical and surveillance sea tests in the
- (U) Conduct joint surface and submarine tactical sea tests in
- (U) Analyze FY 1992 tests and provide reports on both scientific and operational results to all ASW platform users.

4. (U) PROGRAM TO COMPLETION:

- (U) Conduct two sea tests per year in FY 1994 and 1995.
- (U) Conduct one sea test in FY 1996.
- (U) Complete analysis of all sea tests.
- (U) Demobilize sea test assets by mid FY 1997.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603747N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Advanced ASW Technology
PROJECT NUMBER: X1959 PROJECT TITLE: Critical Sea Tests, Phase II

D. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, DC; NRL-SSC, Stennis Space Center, MS; NOSC, San Diego, CA; NCEL, Point Hueneme, CA; NADC, Warminster, PA; and NUSC, New London, CT. CONTRACTOR: The John Hopkins University/Applied Physics Laboratory, Laurel, MD.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: None.
2. (U) SCHEDULE CHANGES: None
3. (U) COST CHANGES: +\$5.8M in FY 93 enables conduct of two full sea tests away from CONUS.

F. (U) PROGRAM DOCUMENTATION:

NAPDD

October 1986

G. (U) RELATED ACTIVITIES: PE 0605863N (RDT&E Ship/Aircraft Support) provides for lease and basic operating costs of the Cory and Amy Chouest research ships. PE 0603785N (ASW Environmental Acoustic Support (AEAS)) provides at-sea measurements and data collection;

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE:

Plan and Execute Phase II Sea Tests	1/4 Qtrs FY 1992
Complete Data Analysis	1 Qtr FY 1993
Plan and Execute Sea Tests	2/4 Qtrs FY 1993
Complete Data Analysis	1 Qtr FY 1994
(See paragraph C.4. for milestones to project completion in FY 1997)	

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603747N **BUDGET ACTIVITY:** 2
PROGRAM ELEMENT TITLE: Advanced ASW Technology
PROJECT NUMBER: X2100 **PROJECT TITLE:** Advanced Deployable Array

C. (U) **DESCRIPTION:** Advanced Deployable Array (AdDA) provides an early shallow water ASW threat data collection capability. Later phases of the six-year project provide for modular, autonomous operation, and a deployment data collection capability.

(U) AdDA initially includes acoustic and on-the-bottom sensors and a processing system suitable for both configurations. The acoustic array will also be capable of: for measurements.

sensors will be incorporated in FY 1994. The array will utilize fiber optic undersea communication technology and autonomous power for high data rate and long transmission lengths with lightweight assemblies. Modular design configurations will be evaluated for

to meet a variety of collection mission requirements. The project complements both the effort under the Advanced Collection Technology project H2089 portion of this Program Element and longer-life fixed and deployable undersea surveillance developments.

D. (U) **PROGRAM ACCOMPLISHMENTS AND PLANS:**

1. (U) **FY 1991 ACCOMPLISHMENTS:** Not applicable

2. (U) **FY 1992 PROGRAM:** Utilize development contracts awarded in 1991 for system design to specific sites and performance requirements; and fabricate an over-the-side surface ship deployable sensor array.

3. (U) **FY 1993 PLANS:** Deploy sensor array in appropriate shallow water high noise area, operating partially against controlled targets. Analyze and promulgate data relative to threat vulnerabilities and AdDA deployment options.

4. (U) **PROGRAM TO COMPLETION:** Design, fabricate and deploy two additional systems for collection of potential threat submarine data in real world sites. Last system includes sensors and is capable of deployment (FY 1996/97).

E. (U) **WORK PERFORMED BY:** IN-HOUSE: NOSC, San Diego, CA. **CONTRACTORS:** Selected on a competitive basis.

F. (U) **RELATED ACTIVITIES:** Utilizes components developed by DARPA and from PE 0603708N, ASW Signal Processing; PE 0604784N, Fixed Distributed System; and PE 0101224N, SSBN Security Technology Program.

G. (U) **OTHER APPROPRIATION FUNDS:** Not applicable.

H. (U) **INTERNATIONAL COOPERATIVE AGREEMENTS:** Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603747N BUDGET ACTIVITY: 2
 PROGRAM ELEMENT TITLE: Advanced ASW Technology
 PROJECT NUMBER: H2089 PROJECT TITLE: Advanced Collection Technology

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
H2089	Advanced Collection Technology	10,880	10,863	11,058	CONT.	CONT.

B. (U) DESCRIPTION: This program provides the capability to obtain data at being exploited by ASW systems currently being developed. Programs such as Low Frequency Active require data in the region. There is currently of actual One effort of this program is the development of a family of which will operate and cover U.S. Navy Another effort is the development of sonobuoys which. by being extremely

These sonobuoys, along with sonobuoys, will also be used to determine propagation characteristics of the oceans at these Special will be built which will be able to determine the The ability to will be provided by the development of operating in the region. In addition, these arrays will be evaluated for their ability to

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- (U) Continued effort to develop a new family of Navy Underwater Acoustic Multiple Ping (NUAMP) sonobuoys for the direct measurement of that will cover and frequencies and frequencies utilized by new designs.
- (U) Continued to analyze data collected during exercise Natiye I to provide basis for the development of a prediction model.
- (U) Completed the development of hardware and software for the Sonobuoy Thinned Random Array (STRAP) program and conducted at-sea tests to prove concepts.

2. (U) FY 1992 PROGRAM:

- (U) Continue development of NUAMP sonobuoys and initiate integration of signal processing algorithms into existing signal processors.
- (U) Continue the development of the prediction model.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603747N

BUDGET ACTIVITY: 2

PROGRAM ELEMENT TITLE: Advanced ASW Technology

PROJECT NUMBER: H2089 PROJECT TITLE: Advanced Collection Technology

3. (U) FY 1993 PLANS:

- a. (U) Complete development and testing of NUAMP sonobuoys and complete integration into aircraft signal processor.
- b. (U) Continue development of prediction model, conduct exercise Native II to collect ambient noise and target data.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NADC, Warminster, PA; NATC, Patuxent River, MD; NSWC, White Oak, MD; NWSC, Crane, IN; NAC, Indianapolis, IN; and NOSC, San Diego, CA. CONTRACTORS: Sparton Electronics Division, Jackson, MI.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: None
2. (U) SCHEDULE CHANGES: None
3. (U) COST CHANGES: None

F. (U) PROGRAM DOCUMENTATION: NADDD #239-98 08/15/90

G. (U) RELATED ACTIVITIES: Threat information that will be collected with the system elements developed under this project has been requested by the following PEs: 0603529N, Advanced ASW Target; 0603553N, Surface ASW; 0604713N, Surface ASW Systems Improvement; 0603691N, MK 48 Advanced Capabilities; 0603254N, Air ASW; 0604261N, Acoustic Search Sensors; 0604221N, P-3C Mod Program; 0604212N, LAMPS; and 0604229N, Carrier Inner Zone ASW Helo.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603755N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: SHIP SELF DEFENSE

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1991 ACTUAL	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
20324	FACT	0	16,000	10,880	CONT.	CONT.
22133	QRCC	0	20,000	0	CONT.	CONT.
22136	LINK IRON	0	160,000	149,528	CONT.	CONT.
22138	INFRARED	0	5,000	0	0	5,000
22139	OUTLAW BANDIT	0	20,000	0	0	20,000
	TOTAL	0	221,000	160,408	CONT.	CONT.

B. (U) DESCRIPTION: This program incorporates efforts dedicated to the enhancement of ship self defense against AAW threats. Its primary focus is on the development of technologies, systems and procedures necessary to defeat the evolving anti-ship cruise missile (ASCM) threat. A description of project 22136, Link Iron, is not included due to a higher level of classification.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603755N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: SHIP SELF DEFENSE
PROGRAM NUMBER: 20324 PROJECT TITLE: FORCE ANTI-AIR WARFARE COORDINATION TECHNOLOGY

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT	FY 1991	FY 1992	FY 1993	TO	TOTAL
Number Title	ACTUAL	ESTIMATE	ESTIMATE	COMPLETE	PROGRAM
20324 FACT	0	16,000	10,880	CONT.	CONT.

B. (U) DESCRIPTION: Force Anti-Air Warfare Coordination Technology (FACT) Program is an advanced development effort designed to demonstrate Force Anti-Air Warfare (AAW) concepts and capabilities which will significantly improve our Force defense in depth, including both local area and self defense capabilities against current and future AAW threats. FACT improvements are designed to enhance the AAW warfighting ability of ships and aircraft and to enable coupling of the Force into a single, distributed AAW weapon system and towards more effective use of tactical data and the cooperative use of all the Force sensors and weapons. These capabilities will provide the ship defense flexibility needed to meet the threat brought about by increasing numbers of highly sophisticated weapons held by potentially hostile third world countries. FACT defines requirements and develops prototype systems or modifications to existing systems to test new concepts for the coordination of Force AAW operations. Some examples of prototype systems now in production are AN/SPS-48C Detection Data Converter (DDC), AN/SPS-48E Environmental Control Feature, Shipboard Gridlock System Automatic Correlation, (SGS/AC), and Dial-a-Track Link-11 Quality Selection. Other FACT developments nearing production stages are the Automatic Identification System (Auto-ID) and the Multifrequency Link-11 (MFL) capability. Phasing in of proven near long term system concepts will provide a higher degree of ship defense and battle coordination and effectiveness.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Refer to P.E. 0603382N, Project 80324, for FY 1991 accomplishments.

b. (U) Previous program title was Battle Group Anti-Air Warfare Coordination (BGAAWC). The program has been renamed Force Anti-Air Warfare Coordination Technology (FACT).

2. (U) FY 1992 PROGRAM:

a. (U) Demonstrate initial advanced Auto-ID Cruiser (Phase II Auto-ID).

b. (U) Demonstrate Geodetic SGS/AC in Fleet AAW exercise.

c. (U) Demonstrate advanced Force Threat Evaluation for Weapons Assignment (FTEWA) capabilities in laboratory.

d. (U) Complete feasibility of Remote Data Engage (RDE) between Force units.

e. (U) Demonstrate improved Identification Friend-or-foe (IFF) tracking concepts.

f. (U) Provide recommendations for improving Link-11 interoperability among Force participants, joint services, and allied network participants. Provide recommendations for improving Link-16 integration into Force.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603755N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: SHIP SELF DEFENSE

PROJECT NUMBER: 20324 PROJECT TITLE: FORCE ANTI-AIR WARFARE COORDINATION TECHNOLOGY

3. (U) FY 1993 PLANS:

- a. (U) Integrate RDE capability in shipboard systems.
- b. (U) Demonstrate advanced multi-sensor tracking and Force

Identification.

- c. (U) Demonstrate Silent Gridlock capability.
- d. (U) Complete feasibility of Remote Missile Launch (RML).
- e. (U) Demonstrate full FTEWA in the laboratory.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORKED PERFORMED BY: IN-HOUSE: Fleet Analysis Center, Corona, CA; NAVSWC, Dahlgren, VA; NWSCC, Crane, IN; NAC, Indianapolis, IN; NSWSES, Port Hueneme, CA; FCDSSA, Dam Neck, VA; NOSC, San Diego, CA; ECAC, Annapolis, MD. CONTRACTORS: JHU/APL (Technical Direction Agent), Laurel, MD; ECI, St. Petersburg, FL; PRC, Inc., Arlington, VA; SYSCOM Corporation, Arlington, VA; VITRO, Rockville, MD; LOGICON, San Diego, CA; GESD, Moorestown, NJ.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

- 1. (U) Technology Changes: Not Applicable.
- 2. (U) Schedule Changes: Not Applicable.
- 3. (U) Cost Changes: The FY 1993 funding increase results from a transfer of funds from 0603382N, S3024, in accordance with FY 1992 Congressional action.

F. (U) PROGRAM DOCUMENTATION: MAPDD prepared.

G. (U) RELATED ACTIVITIES:

- o Program Element 0603318N, Advanced Surface-to-Air Missile (SM-2 SLK IV).
- o Program Element 0603717N, Command and Control Systems, provides for the development of communications links.
- o Program Element 0604303N AEGIS Area Air Defense, provides for modifications to the AEGIS Weapon System.
- o Program Element 0604307N, AEGIS Combat System Engineering, relates to engineering development of the DDG 51 and CG 47 Class AEGIS Combat System.
- o Program Element 0604518N, Combat Information Center (CIC) Conversion, provides common baseline computer programs for non-AEGIS systems.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands): Not Applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603763N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Warfare System Architecture and Engineering

PROJECT NUMBER: X1991

PROJECT TITLE: WSA&E

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X1991	WSA&E	8221	7289	8324	CONT.	CONT.

B. (U) DESCRIPTION: Warfare Systems Architecture and Engineering provides the fundamental models, tools, baseline data, and framework to assess the total Navy force warfighting capabilities for JCS scenarios across a complete spectrum of potential conflicts. It provides Top Level Warfare Requirements (TLWRs) as categorical standards for warfare appraisals and for Cost and Operational Effectiveness Analysis (COEA) studies. It provides standard scenarios for joint and naval multi-warfare assessments and provides Navy/joint requirements data bases used to evaluate the present and future warfare effectiveness of Navy forces. Outputs provided by WSA&E yield consistency in rational decision-making processes for the Navy and for joint service programs including force architecture options, operational effectiveness options among alternative weapon systems, prioritization of warfighting requirements, assessment of risks from downsizing, altering force structure, programmatic delays, and evaluation of new proposals.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- (U) Completed Sea Control TLWR, developed Power Projection TLWR.
- (U) Developed Regional Scenarios #2 and #3.
- (U) Completed Sea Control assessment for Regional Scenario #1.
- (U) Developed and assessed options for Regional Scenario #1/#2.
- (U) Developed Power Projection current architecture.
- (U) Developed force multiwarfare assessment for use in POM 94

Summary Warfare Appraisal (SWA).

- (U) Developed Future Aircraft Carrier Study.

2. (U) FY 1992 PROGRAM:

- (U) Complete Power Projection TLWR and obtain Warfare Reqmts Board approval. Develop update #1 to Power Projection and Sea Control TLWRs.
- (U) Update Regional Scenario #2, develop Regional Scenario #4, Concurrent Scenario (includes Scenario #1 update), and Regional Scenario #5.
- (U) Perform multiwarfare assessment of Power Projection.
- (U) Develop and maintain architecture database.
- (U) Develop accreditation process for SWA assessment methodology and tools. Begin to accredit and improve tools.
- (U) Perform assessment using force multiwarfare tools. Develop requirements specifications for long term capability; initiate development.
- (U) Define deficiencies, develop corrections and accredit Strike Warfare (STK) and Space and Electronic Warfare (SEW) tools.

3. (U) FY 1993 PLANS:

- (U) Complete TLWR update #1, begin update #2 to Sea Control TLWR.
- (U) Complete Regional Scenarios #5, #6, #7 and Reconstitution.
- (U) Update architecture databases for: 1994, 2004, and 2014.
- (U) Continue to accredit tools and improve analytic methodology.
- (U) Continue development of force multiwarfare tools.
- (U) Perform force multiwarfare assessment for use in POM 96 SWA.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: DTRC, Bethesda, MD; NOSC, San Diego, CA; NSWC, Dahlgren, VA; NADC, Warminster, PA; NWC, China Lake, CA; NCSC, Panama City, FL; NUSC, Newport, RI; NPGS, Monterey, CA; NRL, Washington, DC; CONTRACTORS: APL/JHU, Laurel, MD; Booz-Allen, Bethesda, MD; SAIC, LaJolla, CA;

E. (U) RELATED ACTIVITIES: Not Applicable.

F. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&D, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603782N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Shallow Water Mine Countermeasure Demos
PROJECT NUMBER: R2127 PROJECT TITLE: Shallow Water Mine Countermeasure Demos

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R2127 Shallow Water Mine Countermeasure Demos	16,580*	4,977*	10,625	Cont.	Cont.

* FY 1991 funding was previously shown in PE 0604373N. FY 1992 funding was previously shown in PE 0603640M.

B. (U) DESCRIPTION: This program will develop an airborne system to carry out mine and minefield detection along an extended, hostile shoreline in support of amphibious landings. In particular, the system will address the current inability to detect mines/minefields in the surf zone (0-10ft water depth) at any time, or to detect mines/minefields in the beach landing zone in darkness. In the near-term the program will build and test an ADM based on the ML-90 helo-borne lidar system, and develop an EDM spec based on the ADM results and on an approved ORD. The far term focus will be to develop two incremental increases in capability to allow the system to be deployed on UAVs and or Pods and eventually on high performance UAVs or aircraft. These advances will systematically increase the search rate, probability of detection, discretion, and rate of coverage.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- (U) Developed Joint USN/USMC Mine Detection Program utilizing existing test beds in response to Congressional concerns.
- (U) Demonstrated high-power, high rep-rate, micro-channel-cooled laser.
- (U) Deferred hardware technology development in lasers, cameras and scanners started in PE0603640M pending outcome of technology assessments.
- (U) Restructured and expanded technology developments in shallow water image processing. Initiated contracting for classified effort.
- (U) Designed and prototyped image processor, wrote algorithms.
- (U) Developed draft execution plan for Joint Program.
- (U) Joint Program deferred by Congress in favor of adaptation of Magic Lantern system to meet Marine Corps requirements.

2. (U) FY 1992 PROGRAM:

- (U) Initiate adaptation of ML 90 system to meet Marine Corps shallow water mine countermeasures near term reconnaissance requirements. This is being accomplished by integration with the ongoing Magic Lantern contract process.
- (U) Upgrade the government analytical performance model. This includes tank and pier testing of optics/imaging components, assessment of contractor designs, evaluation of test data, establishment of Advanced Development Model (ADM) specifications, and transition of the performance model to the ADM contractor.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603782N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: Shallow Water Mine Countermeasure Demos
PROJECT NUMBER: R2127 PROJECT TITLE: Shallow Water Mine Countermeasure Demos

c. (U) Develop advanced image processing capability. This includes development of the Mark I processor and associated algorithms and transition of image processing technologies and specifications to the ADM contractor.

d. (U) Initiate Shallow Water Mine Countermeasure Near Term Advanced Development Model contract.

3. (U) FY 1993 PLANS:

a. (U) Continue image processing and model development (Mark II) to support adaptation of the ML 90 system and evaluate it against ability to achieve goals and near term requirements.

b. (U) Complete and test Shallow Water Mine Countermeasure Near Term Advanced Development Model.

c. (U) Complete Engineering Development Model Specifications.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Naval Surface Warfare Center (NSWC), Panama City, FL; CONTRACTORS: Kaman, Tucson, AZ and Bloomfield, CT; EG&G, Santa Barbara, CA; APL (JHU-Laurel, MD & UW-Seattle, WA); Mitre, McLean, Va; Fibertec, Reston, VA; AMT, Irvine, CA; TI, Dallas, Texas; Rockwell Int., Anaheim, CA; ERIN, Ann Arbor, MI; United Technology, West Palm Beach, FL.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

(Note: Comparison is with respect to funding shown in PE 0603640M and PE 0604373N in previous budget submits.)

1. (U) TECHNOLOGY CHANGES: The FY 1992/3 effort adapts Magic Lantern technology to Marine Corps and Navy needs. As a result of Congressional direction, the Joint Program started in FY 1991 is being deferred.

2. (U) SCHEDULE CHANGES: Adaptation of Magic Lantern technology to Marine Corps applications will result in earlier availability of a limited capability system. Development of technology for systems with higher sweep rates and greater sensitivities will be necessary as a follow-on effort.

3. (U) COST CHANGES: FY 1993 funding of \$10,625K was inserted to continue Congressionally directed program.

F. (U) PROGRAM DOCUMENTATION: A Program Plan is being developed to implement Congressional direction.

G. (U) RELATED ACTIVITIES: PE 0603612M, Marine Corps Mine Countermeasures; and PE 0604373N, Airborne MCM.

H. (U) OTHER APPROPRIATION FUNDS: None.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603782N

BUDGET ACTIVITY: 2

PROGRAM ELEMENT TITLE: Shallow Water Mine Countermeasure Demos

PROJECT NUMBER: R2127 PROJECT TITLE: Shallow Water Mine Countermeasure Demos

J. (U) MILESTONE SCHEDULE:

- | | |
|---|--------|
| 1. (U) Commence ML 90 ADM adaptation | 1QFY92 |
| 2. (U) Complete Government Specification, negotiate contract. | 3QFY92 |
| 3. (U) Complete pier test and tests of optics | 3QFY92 |
| 4. (U) Complete design of Mark I processor and algorithms. | 4QFY92 |
| 5. (U) Negotiate ADM contract | 4QFY92 |
| 6. (U) Commence Near term EDM | 1QFY93 |
| 7. (U) Complete Mark II processor and algorithm | 3QFY93 |
| 8. (U) Deliver and test ADM hardware | 4QFY93 |
| 9. (U) Develop EDM Specification | 4QFY93 |
| 10. (U) Commence EDM Contracting efforts | 4QFY93 |

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603785N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ASW Environmental Acoustic Support (AEAS)

A. (U) RESOURCES: (Dollars in thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0120	AEAS Ocean Measurement and Modeling Project	14,706	14,178	14,678	CONT.	CONT.
R2017	Advanced Underwater Acoustic Modeling Project	2,472	3,134	3,153	CONT.	CONT.
TOTAL		17,178	17,312	17,831	CONT.	CONT.

B. (U) DESCRIPTION: The ASW Environmental Acoustic Support (AEAS) Program provides ocean environmental acoustic R&D to assess, enhance and predict the performance of current and proposed undersea surveillance, tactical and weapon systems. Emphasis is placed on shallow water/regional conflict scenarios. Mine warfare and mine countermeasure issues are addressed within the context of these scenarios. This effort is accomplished through at-sea experimentation, numerical model and data base development, fleet technical support and instrumentation development. AEAS Research and Development supports all scales of Naval operations, including global, theater, regional, and local. Additionally, AEAS products are being tailored for, and assimilated into, fleet trainers in order to provide realistic support to warfare simulations. Direct support to existing fleet systems is provided in the Combatant Data Collection thrust which focuses on measurements through the weapon system and direct, real-time feedback to optimize system performance in tactical situations.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603785M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ASW Environmental Acoustic Support (AEAS)
PROJECT NUMBER: R0120 PROJECT TITLE: AEAS Ocean Measurement and Modeling Proj

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0120	AEAS Ocean Measurement and Modeling Project	14,706	14,178	14,678	CONT.	CONT.

B. (U) DESCRIPTION: The quieting of new generation threat submarines has dramatically reduced the detection ranges achieved by existing passive acoustic ASW systems. Additionally, the concern over Third World conflicts has renewed the need to counter a shallow water, diesel submarine capability. To counter these threats, there is an urgent and continuing need to enhance system performance through a better understanding of the ocean environment. This project provides environmental acoustic predictive capability and data essential to optimize the design, development and performance of under-sea acoustic surveillance and tactical ASW systems, thus extending detection ranges, increasing time to possible enemy counter-detection and enhancing ASW platform survivability. It conducts undersea environmental and acoustic measurements and develops computer prediction products, measurement instrumentation, data bases and analyses in support of ASW systems.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Analyzed results from FY 1990 open ocean experiments to influence Fixed Distributed System design/deployment (FDS-D) decisions and low-frequency active sonar development.
- b. (U) Conducted ocean experiment in high interest area (e.g., northwestern Pacific) in support of low frequency active sonar development.
- c. (U) Prepared pre-assessments of ocean areas to determine performance of emerging ASW systems, with emphasis on deployable systems (e.g. FDS-D, Sonobuoys).
- d. (U) Delivered a Very Low Frequency (VLF) passive range dependent performance prediction model, ambient noise model and acoustic bottom loss data base.
- e. (U) Initiated efforts to extend.
- f. (U) Completed publication of FY 1988-89 shallow water Arctic exercise products and tactical decision aids.
- g. (U) Developed survey and databasing technique for volume reverberation studies.
- h. (U) Participated in bottom distributed system Air Defense Initiative (ADI) field experiment in Pacific.
- i. (U) Initiated ocean simulation capability for expanded acoustic/oceanographic programs.
- j. (U) Began major environmental support to development of a new generation AIR/ASW system trainer.
- k. (U) Completed analysis of Lincoln Sea ambient noise data set.
- l. (U) Participated in a surface tactical sonar system development experiment with NUSC.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603785N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ASW Environmental Acoustic Support (AEAS)
PROJECT NUMBER: R0120 PROJECT TITLE: AEAS Ocean Measurement and Modeling Proj

m. (U) Developed, tested, and transitioned to NAVOCEANO a Northern Hemisphere sound speed profile data base for shallow water.

n. (U) Improved, documented, and transitioned to NAVOCEANO a performance model for the AN/SQQ-32 mine hunting sonar. It is to become the Navy standard model for Mine Countermeasures (MCM) sonars.

2. (U) FY 1992 PROGRAM:

a. (U) Provide environmental data to systems designers for incorporation into emerging ASW systems design concepts.

b. (U) Perform pre-assessments of ocean areas to evaluate ASW system performance characteristics.

c. (U) Support efforts to extend
Increase data collection efforts at lower frequencies. Conduct Acoustic experiment.

d. (U) Continue to participate in major field experiments in support of ASW system design and operations (i.e., FDS, ADI, VLF, LFA, AN/SQQ-891, Critical Sea Test (CST)) by providing data collection, analysis and modeling expertise.

e. (U) Continue development and enhance sophistication of ocean simulation capability.

f. (U) Validate shallow water propagation model for LFA systems.

g. (U) Develop series of background documents which provide basic environmental information for high priority areas required by shallow water warfare planners (ASW, Mine Warfare (MIW), Anti-Mine Warfare (AMW), and Naval Surface Warfare (NSW)).

h. (U) Analyze existing shallow water acoustic data sets in LFA and VLF.

i. (U) Develop prototype product for MCM support using data from sediment classifier.

j. (U) Extend standard prediction model for MCM sonar to support submarine mine avoidance sonar.

k. (U) Initiate development of modeling capability for ambient noise prediction in shallow water.

l. (U) Initiate extension to shallow water of existing deep water shipping data base for use as input to ambient noise model.

m. (U) Initiate planning and pre-assessments for FY-93 sea test to acquire necessary shallow water data to support existing and emerging systems.

n. (U) Complete development of volume reverberation vertical line array and transition to NAVOCEANO.

o. (U) Test and evaluate developmental digital acoustic array.

p. (U) Test and evaluate AEAS Digital Acoustic Buoy System (ADABS),

MOD 1.

q. (U) Conduct Initial Combatant Data Collection (CDC) concept demonstration of real-time in situ environmental data measurement by operational fleet platforms, for the purpose of system performance optimization.

r. (U) Deliver environmental model to AIR/ASW system trainer.

s. (U) Initiate development of environmental module for system simulation model.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603785N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: ASW Environmental Acoustic Support (AEAS)
PROJECT NUMBER: R0120 **PROJECT TITLE:** AEAS Ocean Measurement and Modeling Proj

3. (U) FY 1993 PLANS:

- a. (U) Continue to develop field measurement techniques which will support database requirements for undersea weapon systems.
- b. (U) Support advanced systems concepts by conducting ocean area assessments via modeling and designing of initial survey requirements.
- c. (U) Provide low frequency, near-bottom ambient noise measurements
- d. (U) Analyze LFMA data and provide results to system designers.
- e. (U) Participate in field experiments in support of emerging undersea systems design and operations.
- f. (U) Continue development of environmental models and databases to enhance shallow-water operational capabilities.
- g. (U) Continue to publish shallow water background documents for four high priority areas.
- h. (U) Test and evaluate shallow water ambient noise model with existing data sets. Evaluate shallow water shipping data base.
- i. (U) Develop predictive capabilities for other MCM equipments (e.g., acoustic and magnetic sweeps).
- j. (U) Provide environmental modules to surface and submarine tactical trainers.
- k. (U) Conduct major measurement exercise in shallow water.
- l. (U) Expand CDC capability to other platforms, and demonstrate ability to database the measurements.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NOARL, Bay St. Louis, MS; NRL, Washington, DC; NUSC, New London, CT. **CONTRACTORS:** Applied Research Laboratories, University of Texas, Austin, TX; Planning Systems Inc., McLean, VA and Slidell, LA; Science Applications International Corp., McLean, VA; Systems Integrated, San Diego, CA; Areté Associates, La Jolla, CA.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) **TECHNOLOGY CHANGES:** Not Applicable
2. (U) **SCHEDULE CHANGES:** Not Applicable
3. (U) **COST CHANGES:** Not Applicable

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

G. (U) RELATED ACTIVITIES:

- o PE 0204311N, Undersea Surveillance Systems
- o PE 0604784N, Fixed Distributed System
- o PE 0603792N, Advanced Technology Transition

H. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603785N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: ASW Environmental Acoustic Support (AEAS)
PROJECT NUMBER: R2017 **PROJECT TITLE:** Adv Underwater Acoustic Modeling Proj

C. (U) DESCRIPTION: This Project is focused on the development of a multi-sensor ASW system performance prediction capability in support of low frequency, active ASW systems currently being planned and developed for use in the 1990's.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Finalized development of multi-static, multi-receiver modeling capability.
- b. (U) Provided model and environmental acoustic measurement support to Critical Sea Test (CST) Program (CST 5, 6) and LFA 6, 7 sea tests.
- c. (U) Tested and validated MOD I model, i.e., ocean/acoustic interfaced model, using CST and LFA data.
- d. (U) Developed an ICE CAPABLE multi-static, multireceiver LFA model.

2. (U) FY 1992 PROGRAM:

- a. (U) Develop a multi-source, multi-receiver LFA modeling capability, test the model using CST, LFA, ADI sea test data.
- b. (U) Develop an active bottom loss and sea mount target strength data base for LFA model.
- c. (U) Develop modeling capability for designing a bottom mounted system and a shallow water LFA system.
- d. (U) Deliver the LFA MOD I model to Oceanographic and Atmospheric Master Library/Software Review Board (OAML/SRB) as a Navy standard for SYSCOM, laboratory and contractor use on DTC II and VAX computers.

3. (U) FY 1993 PLANS:

- a. (U) Update/Improve/Evaluate multi-static model for Integrated Undersea Surveillance System (IUSS)/NAVAIR/NAVSEA use; participate in LFA technical evaluation, develop fully 3-D Baseline model.
- b. (U) Develop a 3-D active model using normal modes/Parabolic Equation (PE) transmission loss modeling for more accurate low frequency (100HZ > f) calculations.
- c. (U) Deliver bottom-mounted system model, sonobuoy field model and shallow water capable models to SYSCOMs for evaluations.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NOARL, Bay St. Louis, MS; NRL, Washington, DC; NAVOCEANSYSCEN, San Diego, CA. **CONTRACTORS:** Science Applications International Corp., McLean, VA; Planning Systems Inc., McLean, VA and Slidell, LA; Marine Acoustics Inc., Arlington, VA and Mystic, CT.

F. (U) RELATED ACTIVITIES: o PE 0603792N, Advanced Technology Transition;
o PE 0603747N, Advanced ASW Technology; o PE 0603708N, ASW Signal Processing.

G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603792N

BUDGET ACTIVITY: 2

PROGRAM ELEMENT TITLE: ADVANCED TECHNOLOGY TRANSITION

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R1889	Advanced Technology Transition	48,271	62,108	84,682	CONT.	CONT.
X1959	At Sea ASW Critical Experiments(* Transferred to PE 0603747N)	14,750	*	*	*	*
	TOTAL	63,021	62,108	84,682	CONT.	CONT.

B. (U) DESCRIPTION: The Advanced Technology Transition Program Element addresses a vital issue within the Navy technology base - the transition of maturing technologies which best meet Navy needs. This is often difficult for high risk/high payoff technologies and also for those technologies which tend to have broad systems application. This program is a primary Navy vehicle for implementation of recommendations of the Packard Commission and 1987 Defense Science Board Study. The program provides transition of the Navy's most promising technological opportunities into 6.3B and 6.4 programs through risk-reducing Advanced Technology Demonstrations (ATDs). It provides a linkage between Navy requirements and emerging technologies, promotes transition of the best maturing 6.2 concepts, and reduces systems development risk. The program element also supported the At-Sea ASW Critical Experiments, which transferred to PE 0603747N for FY 1992 and beyond.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603792N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: ADVANCED TECHNOLOGY TRANSITION
PROJECT NUMBER: R1889 PROJECT TITLE: ADVANCED TECHNOLOGY TRANSITION

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R1889	Advanced Technology Transition	48,271	62,108	84,682	CONT.	CONT.

B. (U) DESCRIPTION: This program provides transition of the Navy's most promising technological opportunities into 6.3B and 6.4 programs through risk-reducing Advanced Technology Demonstrations (ATDs). It provides a linkage between Navy requirements and emerging technologies, promotes transition of the best maturing 6.2 concepts, and reduces systems development risk.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Surveillance Infra-Red Search and Track (SIRST) - Discrimination improved; tested against fleet targets.
- b. (U) Quiet Weapon Launch (Quiet Launch) - Launcher fabricated and shipped to NUSC for in-water lab tests.
- c. (U) Ultra-Low-Noise CFA (ULNCPA) - Built and entering test in
- d. (U) Adaptive Monopulse Countermeasures (Monopulse CM) - System integrated. At-sea tests conducted.
- e. (U) Programmable Automated Welding System (PAWS) - Enhanced complex controller/sensors.
- f. (U) Synthetic Red Blood Cells (Syn Blood) - Synthetic red blood cells pilot plant fully operational.
- g. (U) Advanced Techniques/Products for Combat Wound Management (Wound Mngmnt) - Found successful method to treat contaminated gut combat wounds.
- h. (U) Missileborne Integrated Neural Network Demonstration (MINND) - MOD 3 goals obtained with MOD 2 hardware. MOD 3 design shelved.
- i. (U) Undersea Weapons Guidance and Control (Undersea G&C) - In-water demonstration initiated.
- j. (U) Advanced ESM for Ship Defense (Adv ESM) - Continued design of
- k. (U) Advanced Electronic Decoy (Adv Decoy) - Initial vehicle design complete. Baseline payload design established.
- l. (U) Light Weight Planar Array (LWPA) - Prototype components fabricated.
- m. (U) Spotlight - Designed
- n. (U) Fluidic Flight Controls (Fluidics) - Basic design and modelling of critical items completed.
- o. (U) Quiet Surface Ship Propellers (Quiet Props) - Final design of new propeller blades for model scale testing completed.
- p. (U) High Energy Propulsion (High Energy Propul) - Torpedo engine components built and awaiting integration.

2. (U) FY 1992 PROGRAM:

- a. (U) PAWS - Conduct final demonstration.
- b. (U) Syn Blood - Begin large scale production.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603792N

BUDGET ACTIVITY: 2

PROGRAM ELEMENT TITLE: ADVANCED TECHNOLOGY TRANSITION

PROJECT NUMBER: R1889 PROJECT TITLE: ADVANCED TECHNOLOGY TRANSITION

- c. (U) Wound Mngmnt - Conduct trials.
 - d. (U) MINND - Final testing of
 - e. (U) Undersea G&C - Do
 - f. (U) Adv ESM - Conduct at-sea tests.
 - g. (U) Adv Decoy - Perform preliminary flight tests.
 - h. (U) LWPA - Test quarter-scale model.
 - i. (U) SPOTLIGHT - Demonstrate
 - j. (U) Fluidics - Conduct lab tests.
 - k. (U) Quiet Props - Manufacture blades.
 - l. (U) High Energy Propul - In-water testing of
 - m. (U) Multibeam Transient Detection/Classification (Multibeam D/C) -
 - n. (U) SAR Countermeasures (SAR CM) - Dev. subsystem architecture
 - o. (U) Multiband ASMD Tactical EW System (MATES) - Select hardware and define interfaces and performance specifications.
 - p. (U) Submarine Volumetric Towed Array (Sub Towed Array) - System spec, begin procurement of Advanced Development Model.
 - q. (U) Multi-Mission Propulsion Technology (M/M Propul) - Design assessment, integration, and test requirements specified.
 - r. (U) High Performance Ammo Storage Magazine (HP Mag) - Initiate component design.
3. (U) FY 1993 PLANS:
- a. (U) Adv Decoy - System integration and final demonstration.
 - b. (U) LWPA - Fabricate full scale arrays.
 - c. (U) SPOTLIGHT - Demo
 - d. (U) Fluidics - Install and conduct F/A-18 flight tests.
 - e. (U) Quiet Props - Sea trials of installed propellers.
 - f. (U) High Energy Propul - and final tests.
 - g. (U) Multibeam D/C - Preliminary test of
 - h. (U) SAR CM - Test against DOD airborne SAR.
 - i. (U) MATES - Hardware acquisition and integration.
 - j. (U) Sub Towed Arrays - Begin surface ship trials.
 - k. (U) M/M Propul - Motor and vehicle construction.
 - l. (U) HP Mag - Full scale manufacture.
 - m. (U) LPI Communications System - Define data exchange requirements.
 - n. (U) Short-Range Acoustic Data Link - Design breadboard acoustics.
 - o. (U) Advanced ASW Receiver - Design RF pre-conditioning module.
 - p. (U) FE Liquid Crystal ASW Image Processor - System design.
 - q. (U) Advanced Self-Defense Combat System - Conceptual design.
 - r. (U) Terminal Placement for Increased Torpedo Lethality - Terminal homing and fuzing software.
 - s. (U) Space-Based LPI Sensors - System Fabrication/assembly.
 - t. (U) Carrier-based Weapon Systems Trainer - Top-level design.
 - u. (U) Advanced Submarine Propulsor - Blade sections and sensors.
 - v. (U) Corona and Pulsed Power Agent Destruction - Conceptual engineering design.
 - w. (U) Freeze-dried Red Blood Cells - System design for freeze - drying/storage/reconstituting red cells and platelets.
 - x. (U) Voice/Data Integration - Software for controllers.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

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FY 1993 RDTEE, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603792N

BUDGET ACTIVITY: 2

PROGRAM ELEMENT TITLE: ADVANCED TECHNOLOGY TRANSITION

PROJECT NUMBER: R1889 PROJECT TITLE: ADVANCED TECHNOLOGY TRANSITION

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSWC, Dahlgren, VA; David Taylor Research Center, Bethesda MD; NAVAIRDEVCON, Warminster, PA; NAVCOASTSYSCEN, Panama City, FL; NAVOCEANSYSCEN, San Diego, CA; NAVWPNCEN, China Lake, CA; NUSC, New London, CT; NRL, Washington, DC; Harry Diamond Lab, Silver Spring, MD; National Institute of Standards, Gaithersburg, MD; and various DOD activities. **CONTRACTORS:** Idaho National Engineering Laboratory, Idaho Falls, ID; Vestar, Inc, San Dimas, CA; City of Hope National Medical Center, Duarte, CA; SOMATOGEN, Broomfield, CO; Babcock & Wilcox, Lynchburg, VA; Kentucky Medical Research & Development Corp, Louisville, KY; Bioelastics Research, LTD, Birmingham, AL; Oregon Health Sciences Univ, Portland, OR; Hughes, Los Angeles, CA; Locus/Questech, Sunnyvale, CA; EML-Research, Cambridge, MA; Raytheon, Waltham, MA; Texas Instruments, Dallas, TX; INTEL, Santa Clara, CA; 3M, St. Paul, MN; Smith Kline Beecham, Philadelphia, PA; Varian, Palo Alto, CA; ITT, Easton, PA; Thiokol, Elkton, MD; McDonnell-Douglas Aircraft, St. Louis, MO; Hydraulics Research, Textron, Valencia, CA; Coleman Research, Orlando, FL; and the following educational institutions: Applied Physics Lab, John Hopkins University, Laurel, MD; Applied Research Lab, Pennsylvania State University, State College, PA; Applied Research Lab, University of Texas, Austin, Tx; Massachusetts Institute of Technology, Boston, MA; OADR Environmental Research Institute of Michigan, Ann Arbor, MI; University of Louisville, Louisville, KY; University of Colorado, Boulder, CO; University of Dayton; Uniformed Services University of Health Sciences, Bethesda, MD; New Mexico School of Mines, Terra affiliate, Socorro, NM; and Carnegie-Mellon University, Engineering Design Research Center, Pittsburgh, PA.

E. (U) COMPARISON WITH FY 1992 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not applicable.
2. (U) Schedule Changes: Completion of Medical ATDs pushed from FY 92 to FY 93 due to a reduction in FY 92 funding.
3. (U) Cost Changes: +\$3.5M in FY 93 due to rate increases at Navy DBOF activities and increased emphasis on the ATD program, consistent with recommendations of the Defense Science Board.

F. (U) PROGRAM DOCUMENTATION: Non-acquisition Program Definition Documents in place for all Advanced Technology Demonstrations.

G. (U) RELATED ACTIVITIES: Navy and other DOD tech base Program Elements, and industry I&D are sources of technology opportunities for ATDs. All sub-projects are either Navy unique in character or fully coordinated with other Services. For each ATD, a transition plan is in place to facilitate transition from the ATD-stage to the next level of development.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE:

Final transition demonstration:

FY 91: SIRST, Quiet Launch, ULNCFA, and Monopulse CM.

FY 92: PAWS, MINND, Undersea G&C, and Adv ESM.

FY 93: Wound Mngmnt, Syn Blood, Adv Decoy, LWPA, Spotlight, Fluidics Quiet Prop, and High Energy Propulsion.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603794N BUDGET ACTIVITY: 2
PROGRAM ELEMENT TITLE: C3 ADVANCED TECHNOLOGY
PROJECT NUMBER: X2091 PROJECT TITLE: SEW ADVANCED TECHNOLOGY

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	FY1991	FY1992	FY1993	TO	TOTAL
TITLE	ACTUAL	ESTIMATE	ESTIMATE	COMPLETE	PROGRAM
X2091 Space and Electronic Warfare Advanced Technology	0	1,365	2,110	Cont.	Cont.

B. (U) DESCRIPTION: This program provides demonstrations of Advanced Technology for the next generation communication systems for U.S. Navy ships, aircraft, and submarines. Projects will be conducted in three Command, Control, and Communications systems (C3) areas: (1) Automated Integrated Communications System (AICS), the application of digital networking techniques to voice, data, and video communications; (2) Transition of C3 developmental software to Ada; and (3) a Multi-Level Secure (MLS) processing system to provide a common operational picture among tactical units.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Not Applicable.
2. (U) FY 1992 PROGRAM:
 - a. (U) Complete detailed design requirements for AICS; evaluate data base management systems, establish security policy.
 - b. (U) Develop Ada performance predictor and Rapid Prototyping (RP) tool, incorporating automated requirements specification and verification.
 - c. (U) Complete detailed MLS requirements specifications.
3. (U) FY 1993 PLANS:
 - a. (U) Produce AICS preliminary system control software in Ada. Provide laboratory end-to-end demonstration of system concept.
 - b. (U) Commence development of automated Test Generator (TG) to examine Ada code constructs. Continue development of RP tool.
 - c. (U) Prototype candidate MLS architectures. Demonstrate most promising MLS candidate(s) in an architectural context.
4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN HOUSE: NRL, Washington, DC; NOSC, San Diego, CA; NADC, Warminster, PA. CONTRACTORS: Booz-Allen & Hamilton, Inc., Arlington, VA, and others to be determined.

E. (U) RELATED ACTIVITIES: The Communications Support System (CSS) is the overarching infrastructure that ties together into a homogeneous whole aspects of the following Program Elements (PEs): PE 0303401N, Communications Security; PE 0602234N, Systems Support Technology; PE 0602232N, Command, Control, and Communications Technology; PE 0604574N, Standard Embedded Computer Resources; PE 0604231, Tactical Command Systems (TCS); and PE 0301567G, Computer Security Program.

F. (U) OTHER APPROPRIATION FUNDS: Not applicable.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0603795N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Gun Weapon System Advanced Technology
PROJECT NUMBER: S2093 PROJECT TITLE: Gun Weapon System Advanced Technology

A. (U) RESOURCES: (Dollars in Thousands)						
PROJECT NUMBER	TITLE	FY1991 ACTUAL	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S2093	Gun Weapon System Advance Technology	0	5,134	7,935	CONT	CONT

B. (U) DESCRIPTION: The purpose of this program will be the investigation, evaluation, and development of concepts for a Gun Weapon System (GWS) beyond the year 2000. This program will demonstrate capabilities needed to defend ships operating in confined locations. In addition, the program will demonstrate critical Naval Surface Fire Support (NSFS) capabilities necessary to support amphibious operations in the littorals. Current designs have only moderate or limited effectiveness in response to a) high speed maneuvering surface targets, b) small craft (cheap kill), c) precision firing in friendly/enemy confined areas, d) support of over-the-horizon amphibious assaults due to lack of range and projectile guidance, and e) low flying air targets. The program will initially focus on determination of a set of critical gun weapon system technologies such as: propulsion, advanced gun barrels, Global Positioning System utilization, miniature inertial navigation systems and gun hardened imaging sensors. Applicable technologies being explored by other agencies will be evaluated and tailored to provide immediate near term benefits.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS

1. (U) FY 1991 Accomplishments: Not applicable
2. (U) FY 1992 PROGRAM:
 - a. (U) Perform Phase I concept studies for an advanced GWS which will include a Major Caliber Gun System, Short Range Anti-Air/Surface munition, and a long range NSFS/Strike/Suppression of Energy Air Defense (SEAD) munition.
 - b. (U) Assist in development of Mission Needs Statements.
 - c. (U) Develop design requirements, specifications and characteristics for a technology testbed & the following critical subsystems: Integrated seeker/navigator/fuze, directional warhead and airframe design.
 - d. (U) Initiate mission analyses for Anti Air Warfare, Anti Surface Warfare, Strike Warfare, NSFS and SEAD mission areas.
3. (U) FY 1993 PLANS:
 - a. (U) Initiate Operational Requirement Documents for an AAW/ASUW smart munition, NSFS/STKW/SEAD smart munition, electro-optic gun fire control system, and related weaponry.
 - b. (U) Complete studies of directed energy and warhead lethal mechanisms.
 - c. (U) Complete mission analyses AAW, ASUW, NSFS, STKW, and SEAD mission areas.
 - d. (U) Initiate Phase II portion of the program which includes component and technology demonstrator fabrication for a defensive mission GWS and an offensive mission GWS together with related components.
 - e. (U) Refine simulation and modeling of mission scenarios and requirements.
 - f. (U) Evaluate high order tracking algorithms for engagement of highly maneuverable targets.
 - g. (U) Develop high pressure-high stiffness gun barrel
 - h. (U) Complete Architecture & Engineers for testbed, site selection and construction.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVORDSTA, Louisville, KY; NSWC, Dahlgren, VA; NAVORDSTA, Indian Head, MD; NWSC, Crane, IN; Sandia National Labs, Albuquerque, NM; Lawrence Livermore Labs, Livermore, CA; BRL, Aberdeen, MD; ARDEC, Picatinney, NJ. CONTRACTORS: TBD

E. (U) RELATED ACTIVITIES: Not Applicable.

F. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604203N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: STANDARD AVIONICS DEVELOPMENT

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1991 ACTUAL	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0572	JT SRV/NAV STD AVCS					
		7,109	11,439	11,994	Cont.	Cont.
W1630	CAINS II	335	0	0	0	14,974
	TOTAL	7,444	11,439	11,994	Cont.	Cont.

B. (U) DESCRIPTION: A growing concern in Naval Aviation is the proliferation of unique avionic equipment that increases with each new or modified aircraft. This proliferation of unique Contractor Furnished Equipment (CFE), due to non-availability of off-the-shelf Government Furnished Equipment (GFE), has resulted in a growing cost burden in the areas of development, procurement, logistics, and maintenance. This Program Element (PE) addresses this issue by developing common avionics for new programs and retrofit programs, if applicable. All acquisition approaches are followed for the least-cost solution to this need, including joint programs, CFE breakout of peculiar items for broad use, foreign and non-development item investigations (funded under those headings when appropriate) and, when practicable and cost effective, dedicated development efforts. These products have application to new architecture "integrated avionics" aircraft, and also older technology "black box" aircraft with major new efforts directed at bridging the gap between these technologies. This forward and retrofit application of common avionics technology is required to maximize aircraft capabilities at a minimum procurement and support cost. The program will specifically address in service out of production avionics with costly R&M deficiencies and includes planning for the development of components/subsystems which have high reliability, which are easily maintained and which have low life cycle costs. An example of a past successful project under this program is the Standard Central Air Data Computer (SCADC) jointly developed with the Air Force and now in production to be the common system on Navy and Air Force aircraft. Using an integrated common module approach, the reliability of SCADC is 10 to 50 times greater than the 13 types of air data computers it replaces. This P.E. also funds Navy participation and activities involving the Joint Service Review Committee (JSRC) for Avionics Standardization.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604203N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: STANDARD AVIONICS DEVELOPMENT

PROJECT NUMBER: W0572 PROJECT TITLE: JOINT SERVICES/NAVY STANDARD AVIONICS COMPONENTS AND SUBSYSTEMS

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1991 ACTUAL	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE Cont.	TOTAL PROGRAM Cont.
W0572	JT SRV/NAVY STD AVCS	7,109	11,439	11,994		

B. (U) DESCRIPTION: The Joint Service/Naval Standard Avionics Components and Systems (AVCS) project provides for the identification, design, development, test, evaluation and qualification of standard avionics for Navy use and wherever practicable use across all services. Standard avionics systems include the Standard Attitude Heading and Reference System (SAHRS), Ground Proximity Warning Systems (GPWS); Standard Compass System (SCS), a joint service program development with the Air Force-Compass/Attitude Heading Reference System (C/AHRS); a joint service Solid State Barometric Altimeter (SSBA) and a joint service Downed Aircrew Locating System (DALs). Beginning in FY 92, the Low Probability of Intercept (LPI) Altimeter, Common Recording System (CRS) and Airborne Collision Avoidance Warning System (CAWS) will be initiated. Future user needs analysis, including joint service requirements, will continue. Standard avionics systems are procured and installed on many aircraft, including F/A-18, F-14, A-6, EA-6B, AV-8B, E-2C, P-3, T-45, CH-46, M/CH-53, SH-60B/F, HH-60, SH-3, V-22, UH-1N, S-3 and KC-130.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- (U) Completed performance specification development for GPWS (Helo).
- (U) Started qualification/integration testing for SSBA.
- (U) Awarded SC/AHRS EMD contract.
- (U) Completed GPWS Tactical Aircraft (TACAIR) flight demonstration. Initiated TACAIR software for embedding in AN/AYK-14 Navy standard computers.
- (U) Completed feasibility study for DALs implementation in AN/ARC-210 Combination Radio.
- (U) Completed SAHRS/Global Positioning System integration demonstration test.

2. (U) FY 1992 PROGRAM:

- (U) Specification development for LPI Altimeter.
- (U) Perform simulator flight test demonstration for GPWS (TACAIR).
- (U) Develop GPWS (Helo) algorithm embedding in AN/AYK-14 for SH-60B.
- (U) Start qualification testing for SC/AHRS.
- (U) Complete qualification testing for SSBA.
- (U) Validate and verify aircraft integration test deficiencies for SAHRS.
- (U) Complete concept formulation for CRS and CAWS.
- (U) Transfer AN/ARC-210 embedded DALs under P.E. 0204163N.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604203N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: STANDARD AVIONICS DEVELOPMENT
PROJECT NUMBER: W0572 PROJECT TITLE: JOINT SERVICES/NAVY STANDARD AVIONICS
COMPONENTS AND SUBSYSTEMS

3. (U) FY 1993 PLANS:
- (U) Test GPWS (TACAIR) software for AN/AYK-14 by simulator flight test.
 - (U) Continue qualification testing for SC/AHRS.
 - (U) Complete TECHEVAL for SSBA.
 - (U) Award EMD contracts for LPI Altimeter.
 - (U) Award GPWS (Helo) EMD contract for non-AN/AYK-14 users.
 - (U) Obtain Milestone III production decision for SAHRS.
4. (U) PROGRAM TO COMPLETION: This is a continuing program.
- D. (U) WORK PERFORMED BY: IN-HOUSE: NADC, Warminster, PA; NATC, Patuxent River, MD; NAC, Indianapolis, IN. CONTRACTOR: SAHRS: Kearfott/Astronautics Corp., Little Falls, NJ; Northrop Corp., Boston, MA.; GPWS (TACAIR): Ferranti, London, England, DALs: Cubic Corporation, San Diego, CA, and Rockwell Collins, Cedar Rapids, IA; SCS: Smiths Industries, Grand Rapids, MI; SSBA: IS&S Corp, Malvern, PA; LPI Altimeter, CRS and CAWS: TED.
- E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:
- (U) Technology Changes: None.
 - (U) Schedule Changes: GPWS (Helo) and LPI Altimeter schedules have been adjusted to reflect risk reduction and specification definition. SAHRS Milestone III decision has been extended to correct TECHEVAL/OPEVAL deficiencies. CRS and CAWS are proposed milestone decision pending upon approval of Operating Requirements Document (ORD).
 - (U) Cost Changes: None.
- F. (U) PROGRAM DOCUMENTATION:
- | PROGRAM | TDR | OR/ORD | AP | TEMP |
|---------------|-------|--------|-------|-------|
| GPWS (TACAIR) | | 01/87 | N/A | N/A |
| GPWS (HELO) | | 01/87 | DRAFT | DRAFT |
| SAHRS | | N/A | 07/89 | 03/91 |
| SC/AHRS | | 01/86 | 02/91 | 06/91 |
| LPI (A) | 09/90 | DRAFT | DRAFT | |
| CRS | 06/91 | | | |
| CAWS | DRAFT | | | |
- G. (U) RELATED ACTIVITIES: A tri-service formal charter exists to promote joint development of standard avionics components and subsystems through the Joint Services Review Committee (JSRC) on Avionics Standardization. Separate JSRC memorandums of agreement have been established for the SAHRS, GPWS, DALs, SC/AHRS and SSBA.
- H. (U) OTHER APPROPRIATION FUNDS: Applicable airframe appropriations that will use these systems include: F/A-18, F-14, A-6, EA-6B, AV-8B, E-2C, P-3, T-45, CH-46, M/CH-53, SH-60B/P, HH-60, SH-3, V-22, UH-1N, S-3 and KC-130.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604203N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: STANDARD AVIONICS DEVELOPMENT

PROJECT NUMBER: W0572 PROJECT TITLE: JOINT SERVICES/NAVY STANDARD AVIONICS
COMPONENTS AND SUBSYSTEMS

I. (U) INTERNATIONAL COOPERATIVE AGREEMENT: Not Applicable.

J. (U) MILESTONE SCHEDULE:

<u>PROGRAM</u>	<u>M/S I</u>	<u>M/S II</u>	<u>M/S III</u>
GPWS (TACAIR)	N/A	N/A	N/A
GPWS (HELO)	N/A	93/1Q	97/1Q
SAHRS	N/A	85/2Q	93/3Q
SC/AHRS	N/A	91/3Q	95/2Q
LPI (A)	N/A	93/3Q	97/3Q
CRS	N/A	93/2Q	96/2Q
CAWS	N/A	93/2Q	96/1Q

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604208N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Range Instrumentation and System Development
PROGRAM NUMBER: W0604 PROJECT TITLE: Trng Rng & Instr Dev

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0604	Training Range and Instrumentation Development	9,584	9,567	9,190	Cont.	Cont.

B. (U) DESCRIPTION: This project develops specialized instrumentation systems for fleet readiness training while minimizing life cycle costs. Tasks include the following systems: Range Electronic Warfare Simulators (REWS) and associated subsystems, Telemetry (TM), Target Control System (TCS), Large Area Tracking Range (LATR), Laser Training System, Weapons Impact Scoring Set (WISS), Advanced Weapons Training System (AWTS), Imaging Weapons Training System (IWTS) and Large Area Underwater Range (LAUR) Mobile and Fixed Open Ocean Instrumentation and Range Requirements.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:
 - a. REWS Threat Radar Simulator (R&D unit at Southern California Offshore Range) Reached Initial Operational Capability.
 - b. Continued development of LAUR, LATR, WISS, and TM.
 - c. Initiated Full Scale Development (FSD) of REWS Electronic Warfare Range Operations Center (EWROC).
 - d. Completed testing, evaluation and development of Large Scale Target Sensor System (LSTSS).
 - e. Continued testing, evaluation and development of the Laser Evaluation System Mobile (LES-M) Engineering Development Model.
2. (U) FY 1992 Program:
 - a. Initiate review of long term TCS requirements and IWTS.
 - b. Continue development of LAUR, LATR, WISS, EWROC and TM.
 - c. Complete testing, evaluation and development of LES-M.
3. (U) FY 1993 Plans:
 - a. Continue development of LAUR, EWROC, TCS, WISS, IWTS and TM.
 - b. Complete development of LATR; initiate REWS response monitor.
4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORKED PERFORMED BY: IN-HOUSE: NOSC, San Diego, CA; PMTC, Point Mugu, CA; NWC, China Lake, CA; NATC, Patuxent River, MD; NADC, Warminster, PA; NWACC, Corona, CA; NAVSWC, Dahlgren, VA; NUSC, Newport, RI. CONTRACTORS: SRI International, Menlo Park, CA; Bunker Ramo, Westlake, CA; HITRE Corp., Washington, DC; LORAL, Sunnyvale, CA; RCA, Moorestown, NJ; SAIC/MARIPRO, Goleta, CA; EMA INC., Lexington Park, MD, EMC INC., Lexington Park, MD.

E. (U) RELATED ACTIVITIES: None.

F. (U) OTHER APPROPRIATION FUNDS: Procurement funds included within OPN line item #162, Weapons Range Support Equipment.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604211N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: IDENTIFICATION FRIEND OR FOE (IFF) SYSTEMS DEVELOPMENT

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0676	Improved ID Development	8,399	21,975	16,905	Cont.	Cont.
W1253	Combat ID System	218	10,000	0	Cont.	Cont.
	TOTAL	8,617	31,975	16,905	Cont.	Cont.

B. (U) DESCRIPTION: Reliable and secure positive identification (ID) systems are essential elements of battle management in the naval environment. In addition to distinguishing friend from foe for weapons employment, the Navy requires secure, jam-resistant IFF systems for battle group air defense management and air traffic control. The resolution of the identification problem is of special interest to Congress. Identification is multifaceted and includes information received from several sensors (both cooperative and non-cooperative systems). The Combat Identification System (CIS) project (W1253) covers the Navy development aspects of a cooperative question-and-answer IFF system which is the next-generation IFF (NGIFF) replacement for the aging MK XII IFF and cancelled Air Force MK XV IFF. The Improved Identification Development project (W0676) develops Non-Cooperative Target Recognition (NCTR) and integration techniques. This project was restructured to allow rapid fielding of prototypes called Shipboard Advanced Radar Target ID System (SARTIS), an NCTR system, on selected ships and AUTO-ID, a sensor kinematics/doctrine display system, for aircraft carriers and selected Anti-Air Warfare (AAW) ships. These prototype fieldings will start formal full-scale development of systems beginning in FY 1992, including the restructured Centralized IFF (CIFF) project which will provide the vehicle to integrate both cooperative and non-cooperative ID systems.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604211M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: IDENTIFICATION FRIEND OR FOE (IFF) SYSTEMS DEVELOPMENT
PROJECT NUMBER: W0676 PROJECT TITLE: IMPROVED ID DEVELOPMENTS

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0676	Improved ID Development	8,399	21,975	16,905	Cont.	Cont.

B. (U) DESCRIPTION: This project provides for the development and integration of Non-Cooperative Target Recognition (NCTR) techniques and multi-sensor information integration systems for improved Identification (ID).

A secondary effort is rapid deployment of AUTO-ID which takes IFF track, link data and kinematics/doctrine information to better ID/display targets; these features/displays are being incorporated into a restructured Central IFF (CIFF) full-scale development. Program will develop an upgraded AN/SLQ-20 for future integration into the CIFF multi-sensor system. CIFF and AN/SLQ-20 upgrade are the major efforts in FY 1993. Supports Joint-Service NCTR effort.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:

a. (u)

b. (U) Established support infrastructure for installed AUTO-ID prototypes; installed and supported remaining 4 AUTO-ID units.

c. (U) Continued procurement planning/preparation for restructured CIFF program and initiated paperwork for AN/SLQ-20 antenna effort in FY 1992.

2. (U) FY 1992 Program:

a. (u)

b. (u)

c. (U) Continue support of 8 AUTO-ID prototypes installed.

d. (U) Initiate full-scale development of restructured/enhanced CIFF

by 4/92; initiate FSED of AN/SLQ-20 antenna and processor by 6/92.

e. (U) Re-initiate support of Joint-Service NCTR efforts and technology investigations; initiate integration of SARTIS, AN/SLQ-20 and appropriate NCTR systems in CIFF by Pre-Planned Product Improvement (P3I).

f. (U) Explore CIFF applicability for AEGIS application.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604211N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: IDENTIFICATION FRIEND OR FOE (IFF) SYSTEMS DEVELOPMENT
PROJECT NUMBER: W0676 PROJECT TITLE: IMPROVED ID DEVELOPMENTS

3. (U) FY 1993 Plans:

a. (U)

b. (U) Continue support of installed AUTO-ID systems.

c. (U) Continue FSED of CIFF and AN/SLQ-20 antenna/processor; plan for incorporation of appropriate tri-Service NCTR capabilities.

d. (U) Initiate DT/OT testing of new CIFF EDMs.

4. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: COMNAVAIRSYSCOM, COMNAVSPAWARSSYSCOM, COMNAVSEASYSYSCOM, and AEGIS Program Office, Washington, D.C.; NRL, Washington, D.C.; NAVOCEANSYSCEN, San Diego, CA; NAVAIRDEVCON, Warminster, PA; NAVELEXACT, St. Inigoes, MD. CONTRACTORS: Allied-Signal Bendix Communications, Towson, MD; Scope, Inc., Reston, VA; The Johns Hopkins University Applied Physics Laboratory, Laurel, MD.

E. (U) COMPARISON WITH FY 1992/93 PRESIDENT'S BUDGET:

1. (U) Technology Changes: None

2. (U) Schedule Changes: Delay of FY 1992 contract award caused delay of hardware delivery for testing by 5 to 8 months.

3. (U) Cost Changes: The FY 1993 budget decrease \$1.156K is as a result of the delay in the CIFF FY 1992 contract award.

F. (U) PROGRAM DOCUMENTATION:

1. SARTIS: O.R. (NCTR) 2/86; RDC (SARTIS) 1/90; AP and TEMP (CIFF) drafted; TEIN cancelled 12/91.

2. CIFF/Auto-Id integration: O.R. 2/86; program restructured 1/90; AP 4/91; TEMP 1/92.

3. AN/SLQ-20 Upgrade: O.R. 2/86; PCAD 5/91; AP 1/92; TEMP drafted.

G. (U) RELATED ACTIVITIES: P.E. 0603742F, Combat ID Systems; P.E. 0604790A, IFF Equipment.

H. (U) OTHER APPROPRIATION FUNDS: N/A

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable

J. (U) MILESTONE SCHEDULE

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604212N
PROGRAM ELEMENT TITLE: LAMPS
PROJECT NUMBER: H1707

BUDGET ACTIVITY: 4

PROJECT TITLE: LAMPS III IMP

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
H1707	LAMPS III IMP	16,562	30,090	31,840	Cont.	Cont.

B. (U) DESCRIPTION: The Block II Upgrade will enter Engineering and Manufacturing Development (EMD) in FY92 and represents a significant avionics modification to the SH-60B greatly enhancing both primary mission areas of Anti-Submarine Warfare (ASW) and Anti-Surface Warfare (ASUW). The Airborne Low Frequency Sonar (ALFS) will be added to enhance the existing acoustic suite. ASUW effectiveness will be improved with the addition of a multi-mode radar which includes an inverse synthetic aperture (ISAR) mode to permit stand-off classification of hostile threats. An improved electronics surveillance measures (ESM) system will enable passive detection and targeting of radar sources not detectable with the current system. Aircrew and aircraft survivability in hostile environments will be significantly improved through software integration of the self-defense equipments. Provisions for a tactical data transfer (TDT) system to improve platform interoperability by rapid, secure transfer of mission information between multiple air and surface units is included in the upgrade. The Block II Upgrade will improve the capability of the LAMPS MK III Weapons System to provide battle group protection and adds significant capability for low intensity conflicts (LIC) and contingency and limited objective warfare (CALOW) mission needs.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- (U) Completed flight incident recorder testing.
- (U) Began detailed system specification development and interface control document development in preparation for Milestone II decision and EMD.
- (U) Conducted market surveys and developed specification for an Upgraded ESM System.

2. (U) FY 1992 PROGRAM:

- (U) Complete Milestone II review process and begin EMD phase of Block II upgrade.
- (U) Conduct System Requirements Review with Block II upgrade contractors.
- (U) Procure government furnished equipment needed for Block II upgrade EMD contract including ALFS Engineering Development Models.
- (U) Award contracts for Block II upgrade aircraft modification studies and subsystem evaluations.
- (U) Initiate detailed development test planning.
- (U) Award EMD contract for Block II upgrade.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604212N
PROGRAM ELEMENT TITLE: LAMPS
PROJECT NUMBER: H1707

BUDGET ACTIVITY: 4
PROJECT TITLE: LAMPS III IMP

3. (U) FY 1993 PLANS:

- a. (U) Contractor procurement of developmental subsystems.
- b. (U) Enter detail design phase of Block II Upgrade:
 - System software development and subsystem integration.
 - Aircraft modification design.
- c. (U) Conduct System Design Review.
- d. (U) Conduct System Software Review.
- e. (U) Conduct Preliminary Design Review.
- f. (U) Commence contractor and field activity laboratory integration.
 - Begin detailed Development Testing/Operational Testing

preparation.

- Begin detailed hardware and software independent verification and validation (IV&V).

4. (U) PROGRAM TO COMPLETION:

- a. (U) Conduct Critical Design Review.
- b. (U) Complete development and aircraft integration.
- c. (U) Conduct environmental testing.
- d. (U) Conduct contractor flight tests.
- e. (U) Conduct reliability testing.
- f. (U) Conduct DT/OT.
- g. (U) Correct testing deficiencies.

D. (U) WORK PERFORMED BY: IN-HOUSE: NADC, Warminster, PA; NATC, Patuxent River, MD; NAC, Indianapolis, IN; FCDSSA, Dam Neck, VA; NRL, Washington, DC. CONTRACTORS: International Business Machines, Owego, NY, for systems integration; Sikorsky, Stratford, CT, for aircraft integration; AT&T, Greensboro, NC, for UYS-2; Hughes Aircraft, Fullerton, CA, for ALFS.

E. (U) COMPARISON TO FY92/93 PRESIDENT'S BUDGET:

- 1. (U) Technology Changes: None
- 2. (U) Schedule Changes: MS II schedule stretched to reflect delay in ALFS source selection.
- 3. (U) Cost Changes: FY 1993 decreased by \$8,090K which reflects the one year delay in ALFS source selection.

F. (U) PROGRAM DOCUMENTATION: Operation Requirement approved 4/88; Acquisition Plan approved 6/90; Test and Evaluation Master Plan; Operational Requirements Document and all new documentation being updated for FY92 MS II decision.

G. (U) RELATED ACTIVITIES: Program Elements (PE)

- P.E. 0604219N, Airborne ASW developments (development and integration of ALFS into the SH-60F).
- P.E. 0604507N, Navy Standard Signal Processor.
- P.E. 0604261N, Acoustic Search Sensors (Sonobuoys).

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1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604212N
PROGRAM ELEMENT TITLE: LAMPS
PROJECT NUMBER: H1707

BUDGET ACTIVITY: 4

PROJECT TITLE: LAMPS III IMP

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

(U) PROCUREMENT	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE CONT CONT	TOTAL PROGRAM CONT CONT
APPN P-1					
APN-1 #12,13	157,910	260,390	262,778		
APN-5 #38	44,428	29,007	35,151		

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable

J. (U) MILESTONE SCHEDULE:

BLOCK II Upgrade	
MSII	7/92
MSIII	9/97

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604213N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: HELICOPTER DEVELOPMENT

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
H1378	AH-1 ACFT	14,302	11,326	5,415	CONT	CONT
H2088	MLR ACFT	0	0	9,702	CONT	CONT
	TOTAL	14,302	11,326	15,117	CONT	CONT

B. (U) DESCRIPTION: This program funds the upgrade and modernization of the AH-1W COBRA and the development of the Medium Lift Replacement (MLR) aircraft, a replacement for the CH-46. Efforts on the COBRA will include the development of a Night Targeting System (NTS) to permit night or reduced visibility operations, development of anti-armor capability improvements and development of two additional Wing Tip Stations which will allow the simultaneous carriage of air-to-ground and air-to-air weapons without mission degradation. The MLR effort will develop a capability to deliver combat assault troops beyond current CH-46 distances, under extreme environmental and operational conditions, in a high threat environment.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604213N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: HELICOPTER DEVELOPMENT
PROJECT NUMBER: H1378 PROJECT TITLE: AH-1 AIRCRAFT

C. (U) DESCRIPTION: The mission of the AH-1W attack helicopter is to provide close-in fire support and fire support coordination in aerial and ground escort operations during the ship-to-shore phase of amphibious operations and during subsequent operations ashore. Armed with an array of weapons, the AH-1W is limited, however, in its ability to acquire and attack enemy targets at night or during conditions of reduced visibility. The Night Targeting System (NTS) will incorporate targeting for the TOW missile system, Hellfire Optimized Missile System (HOMS), the turreted gun, laser range finder/designator, and day/night sensors with appropriate stabilization/target tracking capabilities. TOW IIA/HOMS development effort will integrate next generation Electronic Counter-Countermeasures (ECCM) capability. Software and hardware modifications will allow missiles to track in all operating environments.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:
 - a. (U) Completed NTS contractor testing.
 - b. (U) Completed NTS aircraft prototype integration.
 - c. (U) Check-out and ground tests performed.
 - d. (U) NTS prototypes accelerated in response to Marine Corps night fighting requirements in February 1991.
 - e. (U) Successful completion of limited testing in May 1991. Units not deployed due to cessation of hostilities.
 - f. (U) Began Wing Tip Station specification development.
 - g. (U) NTS (USMC) trial kit approval.
2. (U) FY 1992 Program:
 - a. (U) Complete NTS DT IIA and OT IIA testing.
 - b. (U) NTS validation and verification completion for first two (USMC) trial kits.
 - c. (U) Obtain NTS Milestone IIA Limited Rate production decision.
 - d. (U) Continue Wing Tip Station competitive procurement activities.
3. (U) FY 1993 Plans:
 - a. (U) Complete NTS TECHEVAL and OPEVAL testing.
 - b. (U) Wing Tip Station MS II and EMD competitive award.
 - c. (U) Wing Tip Station integration begins.
 - d. (U) Initiate acquisition planning development for the TOWIIA/HOMS program.
4. (U) Program to Completion:
 - a. (U) This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NWC, China Lake, CA; PMTC, Ft. Mugu, CA; NATC, Patuxent River, MD; NADEP, Pensacola, FL; and NADEP, Jacksonville, FL. CONTRACTORS: Israel Aircraft Industries, Tamam Plant, Yehud Industrial Zone, Israel; Kollman, Merrimack, NH; Bell Helicopter, Textron, Inc., Ft. Worth, TX.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS:

Aircraft Procurement funds are included within the H-1 B.A. 5 line item.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: By Memorandum of Understanding dated August 1987, the United States Government and the Government of Israel are jointly developing the Night Targeting System for integration into the AH-1W and the AH-1S, respectively. Common development costs are shared on a two-thirds/one-third basis. Unique costs such as aircraft modification are the responsibility of the requiring country.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604213N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: HELICOPTER DEVELOPMENT
PROJECT NUMBER: H2088 PROJECT TITLE: MEDIUM LIFT REPLACEMENT

C. (U) DESCRIPTION: The Medium Lift Replacement (MLR) is a replacement aircraft for the CH-46. The MLR's primary mission will be to provide assault transport of combat troops and equipment during amphibious operations and subsequent operations ashore. The aircraft will have the capability to operate at night, in adverse weather, in a Nuclear-Biological-Chemical environment and over long distances in a high threat environment.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments: Not applicable.
2. (U) FY 1992 Plans: Not applicable.
3. (U) FY 1993 Plans:

a. (U) Conduct study of the MLR ORD to determine if modification of an existing aircraft is appropriate or if a new development aircraft is required.

b. (U) Prepare for a FY-94 milestone I (new development) or II (modified aircraft) DAS.

c. (U) Perform system threat analysis.

d. (U) Perform cost and operational effectiveness analysis.

e. (U) Perform environmental assessment.

f. (U) Develop specifications.

g. (U) Prepare and issue RFP.

h. (U) Evaluate proposals.

i. (U) Perform risk analysis and develop risk management approach.

j. (U) Develop acquisition strategy and program objectives/development baseline.

k. (U) Develop phase exit criteria.

4. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NATC, Patuxent River, MD; NAC, Indianapolis, IN; NAEC, Lakeland, NJ; NATSP, Philadelphia, PA; NADC, Warminster, PA. CONTRACTORS: TED.

F. (U) RELATED ACTIVITIES: Not Applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATION AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

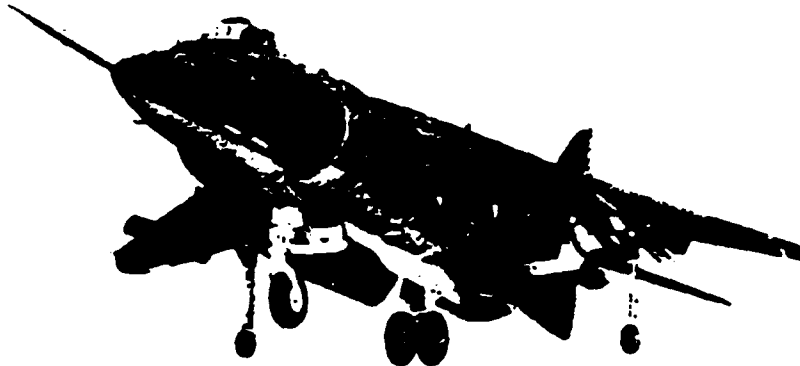
PROGRAM ELEMENT: 0604214N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: AV-8B AIRCRAFT (ENGINEERING)

PROJECT NUMBER: H0652

PROJECT TITLE: AV-8B



POPULAR NAME: HARRIER II

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	TO COMPLETE
PROGRAM MILESTONES	OMNI-7 *RTP 7/91		1ST RADAR DEL 7/93	CONTINUING
ENGINEERING MILESTONES	RADAR CDR 8/91		1ST FLT RADAR 10/92	
T&E MILESTONES	COMM RADAR INTEG. 11/90		R1/R2 S/W 7/93 & 12/93	CONTINUING
CONTRACT MILESTONES	-408 AND 11/90 RADAR AND 11/90			
BUDGET (\$K)	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
MAJOR CONTRACT	23,550	1,550	2,000	Continuing
SUPPORT CONTRACT	0	1,807	700	Continuing
IN-HOUSE SUPPORT	5,296	3,712	6,550	Continuing
GFE/ OTHER	1,321	2,134	1,803	Continuing
TOTAL	30,167	9,203	11,053	Continuing

* Release to Fleet

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604214N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: AV-8B AIRCRAFT (ENGINEERING)

PROJECT NUMBER: H0652

PROJECT TITLE: AV-8B

B. (U) DESCRIPTION: The program provides for the continued integration and test of existing weapons into the AV-8B, envelope expansion of day attack and night attack aircraft, and the development and test to correct fleet software discrepancies. Testing the 100% Leading Edge Root Extension (LERX), a joint development with the UK which will provide increased instantaneous turn rate and combat capability, is underway. An effort is ongoing to upgrade and test the aircraft engine to a F402-RR-408 providing increased safety, supportability and as well as increased hot-day performance. A current development effort, funded jointly by the United States, Italy and Spain, is underway to integrate and test the AN/APG-65 radar (currently in use on the F/A-18) to provide enhanced air-to-ground and air-to-air mission capability.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Weapons integration/envelope expansion with upgraded AV-8B and AV-8B Night Attack System Operational Flight Program software (SIDEARM AGM-122A). OMNI-7 RTF 7/91.
- b. (U) Awarded -408 Engine Development Contract 11/90.
- c. (U) Completed initial phase F402-RR-408 engine ground and flight testing.
- d. (U) Completed initial phase of 100% Leading Edge Root Extension (LERX) testing.
- e. (U) Adapted Engine Monitoring System software for -408 engine.
- f. (U) Awarded Radar/Integration Contract 11/90. Initial contract awarded with Foreign funds per MOU.
- g. (U) Commenced Radar Integration (Engine, Avionics, Airframe) and test planning.

2. (U) FY 1992 PROGRAM:

- a. (U) Continue on-going F³I projects.
- b. (U) Commence development ground and flight testing of redesigned F402-RR-408 engine case leading to interim fleet operating clearance.
- c. (U) Continue weapons integration/envelope expansion.
- d. (U) Continue Radar Integration test planning and preparation of test facilities.

3. (U) FY 1993 PLANS:

- a. (U) Continue on-going F³I projects.
- b. (U) Complete ground and flight testing of the F402-RR-408 redesigned engine case. Issue final fleet operating clearance.
- c. (U) Commence contractor radar flight testing 10/92.
- d. (U) Commence R1, R2 and R3 Software validation and verification efforts.
- e. (U) Commence Radar Integration and Flight Testing (FQ&P, Loads, Avionics, OFF). R1 S/W RTF 7/93; R2 S/W RTF 12/93.
- f. (U) Release Block 1 (R1) Radar Software to the fleet to provide Air to Ground Ranging mode for weapons delivery.
- g. (U) Release Block 2 (R2) Radar Software to the fleet to provide Search, MAP, NAV and GMT Air to Surface radar modes.
- h. (U) Commence software updates to integrate AIWS, AGM-88 HARM, SIDEARM II, ARS, and CAS/JDAMP weapons.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604214N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: AV-8B AIRCRAFT (ENGINEERING)

PROJECT NUMBER: H0652

PROJECT TITLE: AV-8B

D. (U) WORK PERFORMED BY: IN-HOUSE: NATC, Patuxent River, MD; NWC, China Lake, CA; NADC, Warminster, PA; NAPC, Trenton, NJ; NAC, Indianapolis, IN; NADEP, Cherry Pt. NC; NATSF, Philadelphia, PA. CONTRACTOR: McDonnell Douglas Corporation, Saint Louis, MO.; Rolls Royce, Bristol, United Kingdom; Hughes Aircraft Company, Los Angeles, CA.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: None.
2. (U) SCHEDULE CHANGES: None.
3. (U) COST CHANGES: None.

F. (U) PROGRAM DOCUMENTATION:

OR AV-8B 10/75; Night Attack 10/84; RADAR 8/88

DCP 160 Rev 1/87

PMP (RADAR) 7/90

TEMP AV-8B Rev 7/91; RADAR 5/92 (Est)

G. (U) RELATED ACTIVITIES: Not Applicable.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT.					
APN-1 #5,4	490,179	230,000	0	0	6,432,656
Quantity	21	6	0	0	279
APN-5 #28	2,989	19,791	11,374	82,273	166,893
(U) MILCON	0	0	0	0	8,300

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS:

1. (U) A Memorandum of Understanding (MOU) between the Governments of the United States (USG) and the United Kingdom (UKG) entitled the "AV-8B/GR5 Agreement" was signed in 1981. Under the Agreement the USG and UKG fund their own program and share in the cost of changes common to AV-8B and GRmk5 aircraft. USG procures AV-8B aircraft from McDonnell Aircraft Company who subcontracts the Aft Fuselage from British Aerospace. The UKG procures its GRmk5 aircraft from British Aerospace who subcontracts the Forward Fuselage and Wing from McDonnell Aircraft Company. In July 1987 a supplement to the MOU was signed detailing AV-8B Night Attack cooperative development. In November 1988 a supplement to the MOU was signed covering joint development of a 100% Leading Edge Root Extension (LERX).

2. (U) A MOU with the Government of Spain (GOS) and the Government of Italy (GOI) for the integration and test of the AN/APG-65 radar in the AV-8B aircraft was signed in September 1990.

3. (U) MOU with the Government of Spain (GOS) and the Government of Italy (GOI) for the production of the number of radar equipped AV-8B HARRIER II+ aircraft currently authorized and funded has been negotiated and will be signed in early 1992. It includes provisions for work sharing and for cooperative support of the program infrastructure for a period of ten years.

J. (U) TEST AND EVALUATION: This information is included in the FY 1993 Congressional Data Sheets.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604215N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Support Equipment

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0601	Aircraft Handling and Service Equipment	4,372	4,351	5,376	CONT.	CONT.
W0852	Consolidated Automated Support System (CASS)	11,827	437	9,277	CONT.	CONT.
W1842	Aircraft Gas Turbine Facility	2,025	1,861	0	0	3,886
S1857	Calibration Standards	4,005	3,279	3,835	CONT.	CONT.
	TOTAL	22,229	9,928	18,488	CONT.	CONT.

B. (U) DESCRIPTION: Aircraft Handling and Servicing Equipment is a program to develop the common support equipment required to support new technology aircraft. CASS will design and develop modularly-constructed automated test equipment with computer assisted, multi-functional capability based on standardized hardware and software elements. Aircraft Gas Turbine Test Facility is a DoD joint program to develop a Standard Gas Turbine Test Facility to support future Navy and Air Force requirements. CAL Standards is a Navy-wide program to develop required field level calibration standards (hardware) in all major measurement technology areas.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604215N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Support Equipment

PROJECT NUMBER: W0601

PROJECT TITLE: A/C Handling & Service Eqp.

C. (U) DESCRIPTION: This project improves the supportability of the Navy's Fleet through the application of new technology to the development of Support Equipment (SE). The primary objective with these R&D efforts is to improve aircraft readiness with cost saving Fleet equipment introductions.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Engine Testing Capability - Began construction of Standardized Engine Test System (SETS) prototype.

b. (U) Commenced following development efforts: Carbon Dioxide Blasting Units (new coatings-removal technology); improved Generator Test Stand (GTS) (replacement for obsolete stands); Fuel Contamination Detection Unit (optical scanning sensor for monitoring aircraft fuel quality); Universal Fuel Sampling Units; Hand-held Ultrasonic Units (portable detector for skin-to-core debonds in composites); and High-Definition X-ray Unit (MDI).

2. (U) FY 1992 PROGRAM:

a. (U) Complete and deliver prototype for SETS.

b. (U) Develop and construct prototypes for Carbon Dioxide Blasting Units, GTS, Hand-Held Ultrasonic Units, and Fuel Sampling Unit.

c. (U) Assess and evaluate technologies and establish fuel distribution systems for the Fuel Contamination Unit.

d. (U) Develop specifications for High-Definition X-ray Unit.

e. (U) Provide technical support funding for joint weapons boresight capabilities improvement.

f. (U) Commence development efforts for improved Aircraft Canopy covers based on Operation Desert Storm lessons learned.

3. (U) FY 1993 PLANS:

a. (U) Test and evaluate SETS, GTS, Hand-Held Ultrasonic Units, Fuel Sampling Unit, and Carbon Dioxide Blasting Units.

b. (U) Commence construction of High-Definition X-ray Unit, Fuel Contamination Unit, and Aircraft Canopy Cover prototypes.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: Naval Air Engineering Center, Lakehurst, NJ; Naval Air Test Center, Patuxent River, MD, and Naval Aviation Depots. CONTRACTORS: Hilton Systems Inc., Jackson, MS (SETS), ARL, Inc., Arlington, VA (GTS).

F. (U) RELATED ACTIVITIES: The Advanced Boresighting program is part of a coordinated Tri-Service effort endorsed, supported, and directed by the Joint Logistics Commanders. There is no duplication of effort within DoD. Related Program Element: 0603801A (Advanced Maintenance Concepts).

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

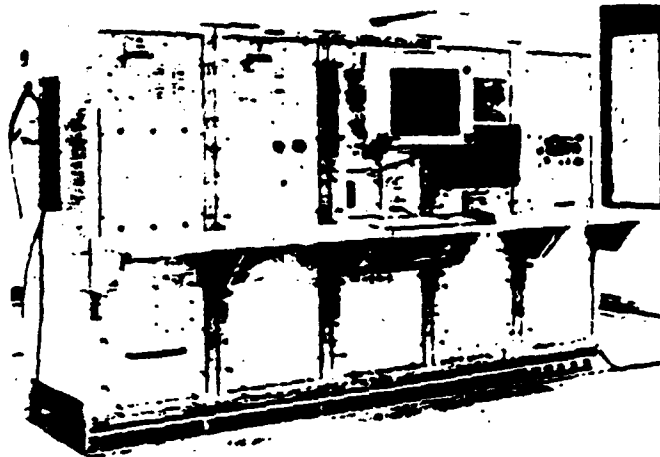
PROGRAM ELEMENT: 0504215N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Support Equipment

PROJECT NUMBER: W0852

PROJECT TITLE: Consolidated Automated Support System (CASS)



POPULAR NAME: CASS

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	TO COMPLETE
PROGRAM MILESTONES		IOC 8/92 IIA-2 4/92	III 1/93	FOC 6/95
ENGINEERING MILESTONES			PCA 12/92	
T&E MILESTONES		OT-IIB 2/92		
CONTRACT MILESTONES		LRIP-II 6/92	FRP 4/93	
BUDGET (\$K)	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
MAJOR CONTRACT	2,135	0		Continuing Continuing
SUPPORT CONTRACT	145	0		Continuing Continuing
IN-HOUSE SUPPORT	8,575	0	9,277	Continuing Continuing
GFE/OTHER	972	437	0	Continuing Continuing
TOTAL	11,827	437	9,277	Continuing Continuing

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604215N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Support Equipment

PROJECT NUMBER: W0852

PROJECT TITLE: Consolidated Automated Support System (CASS)

- B. (U) DESCRIPTION: This project will design and develop modularly-constructed automated test equipment with computer-assisted, multi-functional capability based on standardized hardware and software elements. CASS responds to Fleet Commanders' expressed requirements to correct serious deficiencies in existing automatic test equipment. Program objectives are: (1) increase material readiness; (2) reduce life cycle costs through standardization of equipment and all logistics elements; (3) improve tester sustainability at depot and intermediate maintenance (including Aircraft Carriers) levels; (4) reduce proliferation of unique test equipment; and (5) provide Navy-wide test capability for existing and future avionic/electronic requirements. With test stations that can be easily configured to satisfy different test requirements (i.e., electro-optical, radio frequency, laser, infrared, inertial navigation, etc.) and design provisions which permit modification to meet the demands of future technology, this tester system will increase repair facility throughput capability, reduce spare parts and personnel training requirements, and significantly reduce tester footprint on space critical Aircraft Carriers.

(U) Current R&D effort addresses development of a CASS missile test capability for the following missiles: AAM, AINS, AMRAAM, HARPOON, PHOENIX, and HARM.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Restructured contract for LOT I (LRIP-I) from FFP to FPIS.
- b. (U) Initiated a Test, Analyze and Fix (TAF) program to redesign and test contractor furnished software changes to improve reliability and maintainability (R&M).
- c. (U) Tested initial software upgrades and demonstrated improved R&M.
- d. (U) Completed Phase I study and evaluation of development approaches for a missile test capability.
- e. (U) Initiated in-house Phase II development effort at PMTC, Point Mugu, CA for missile test capability.

2. (U) FY 1992 PROGRAM:

- a. (U) Complete and fully demonstrate the effectiveness of all software changes.
- b. (U) Complete OPEVAL (OT-IIB).
- c. (U) Obtain approval (MS IIA-2) for and continue limited rate production, (LRIP-II), (JUN 92).
- d. (U) Continue development of the missile test capability.

3. (U) FY 1993 PLANS:

- a. (U) Complete Physical Configuration Audit (PCA), (Dec 92).
- b. (U) Obtain approval (MS III) for and commence full rate production, (FRP), (Jan 93).
- c. (U) Complete certification of a dual competitive source.
- d. (U) Continue the Phase II development effort for a missile test capability. All-up-round test capability for the following missiles being addressed: AINS, AMRAAM, HARPOON, PHOENIX, and HARM.

4. (U) PROGRAM TO COMPLETION:

- a. (U) Complete development of missile test capability.
- b. (U) Initiate P/I program to support introduction of new technology and weapons systems.
- c. (U) This is a continuing program.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604215N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Support Equipment

PROJECT NUMBER: W0552

PROJECT TITLE: Consolidated Automated Support System (CASS)

D. (U) WORK PERFORMED BY: IN-HOUSE: NAEC, Lakehurst, NJ; NATC, Patuxent River, MD; PMTC, Point Mugu, CA; Naval Aviation Depots: Jacksonville, FL, North Island, CA, and Norfolk, VA; NAVWPNSTA, Seal Beach, CA. CONTRACTORS: General Electric Co., Daytona Beach, FL; Martin Marietta, Americus, GA.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) Technology Changes: None.
2. (U) Schedule Changes: Navy testing revealed deficiencies in achieving reliability and maintainability design thresholds, due mainly to software problems. Redesign and retesting has delayed OPEVAL to February 1992 and the full rate production decision to January 1993.
3. (U) Cost Changes: Not Applicable.

F. (U) PROGRAM DOCUMENTATION:

	Current	Update
ORD	10/91	
NDCP	6/86	3/92 (IPS)
TEMP	1/92	

G. (U) RELATED ACTIVITIES: A Memorandum of Agreement (MOA) was executed between the Naval Air Systems Command (NAVAIR) and the Air Force System Command (AFSC) in which the Navy will provide complete depot level repair for AMRAAM on CASS. A Memorandum of Understanding (MOU) has also been executed between the U.S. Army and the Naval Air Systems Command for technical support and procurement of the CASS Electro-Optical Subsystem for integration with the Army's Integrated Family of Test Equipment (IFTE) program.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT (AIRCRAFT PROCUREMENT, NAVY)					
Aircraft Spares and Repair Parts (BA6)	7,340	9,900	0	162,660	179,900
Aircraft Support Equipment and Facilities (BA7)	49,309	143,481	169,253	1,480,448	1,962,500
(Quantity)	(19)	(41)	(66)	(543)	(720)
(U) OPERATION AND MAINTENANCE, NAVY					
Central Supply and Maintenance (BA7)	75	43	1,756	36,783	39,310
Training, Medical and Other General Personnel Activities (BA8)	475	475	400	1,809	3,159
(U) MILCON, NAVY					
Project					
P-185	-	2,000	-	9,190	13,390

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) TEST AND EVALUATION: Phase I of TECHEVAL (DT-IIC1) and the initial Operational Test and Evaluation (OT-IIA) of CASS were successfully concluded during FY 1990 and used to support Navy approval for Low Rate Initial Production (Milestone IIA). Phase II of TECHEVAL (DT-IIC2) was completed in December 1991 and demonstrated reliability and maintainability performance above TEMP thresholds. Operational Test and Evaluation (OT-IIB) commenced in February 1992.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604215N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Support Equipment

PROJECT NUMBER: 81857

PROJECT TITLE: Calibration Standards

C. (U) DESCRIPTION: This project conducts the engineering development of new calibration standards (hardware) required to support/maintain advanced technology weapon systems and associated support equipment.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Completed engineering development and testing of the 30 MHz Attenuation Standard, the Millimeter Wave Power and Attenuation Prototype, the Fiber Optic Calorimeter Standard, the Optical Time Domain Reflectometer Calibrator Prototype, the Infrared Imaging Radiometer Prototype, the AC Voltage Calibration System, the Portable Low level Vibration Calibration System, the Automated Test Equipment Transport Standard, and the Equipment Tolerancing System. Continued development of the Low Level Radiometer Prototype Standard, the IR Diffuse Reflectance Standard and four standards begun in FY 1990. Began engineering development of six new standards/systems.

2. (U) FY 1992 PROGRAM: Continue/complete engineering development and testing of twelve standards referenced above. Begin engineering development of eight new standards.

3. (U) FY 1993 PLANS: Continue/complete engineering development and testing of twelve standards referenced above. Begin engineering development of five new standards.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY:

IN-HOUSE: National Institute of Standards and Technology, Washington, DC; NRL, Washington, DC; Navy Metrology Engineering Center, Corona, CA; Navy Primary Standards Laboratory, San Diego, CA. CONTRACTORS: Not Applicable.

F. (U) RELATED ACTIVITIES: The individual projects in this program are a Navy lead responsibility as part of a coordinated Army and Air Force endorsed effort. PE 0603001A Logistics Advance Technology; 0702207F Depot Maintenance; PE 0603125C Limited Defense System; and 0603218C Research and Support Activity.

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604217N BUDGET ACTIVITY: 4
PROGRAM ELEMENT: TITLE: S-3 WEAPON SYSTEM IMPROVEMENT PROGRAM (WSIP)
PROJECT NUMBER: W0489 PROJECT TITLE: S-3 WSIP

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0489	S-3 WSIP	0*	0*	1,154	Continuing	Continuing

* Funded under Nunn amendment, RDT&E, Defense Agencies (P.E. 0603790D)

B. (U) DESCRIPTION: Provides continuation of a series of progressive modular improvements which began with the S-3 WSIP Phase I (S-3A modified to S-3B configuration). Increases multi-mission utility through selective mission avionics/processing upgrades. The Co-Processor Memory Unit (CPMU), a joint U.S./Canadian industrial base development program supported by Nunn funding, provides the core capability for future S-3B modification.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Not applicable.
2. (U) FY 1992 PROGRAM: Not applicable.
3. (U) FY 1993 PLANS: Independent verification/validation and specific platform ground testing to verify the integration of CPMU hardware/software.
4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE - NADC, Warminster, PA; NATC, Patuxent River, MD. CONTRACTORS: Lockheed Aeronautical Systems Company, Marietta, GA; Paramax, St. Paul, MN; Paramax, Winnipeg, Canada; Canadian Commercial Corporation, Ottawa, Canada; and, competitively selected contractors.

E. (U) RELATED ACTIVITIES: PE 0604261N, Acoustic Search Sensors.

F. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands):

	FY 1991 ACTUALS	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT	0	0	0	Continuing	Continuing
APN-5; P-1 Line Item 45					

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Project Agreement between U.S. Navy/Canadian Department of Industry, Science and Technology for development of a mass memory unit signed 2 Jun 1991. Total R&D funding: Canadian, \$4.2M; OSD \$4.0M, Navy, \$1.4M. Development contract signed with Paramax, St Paul, MN on 20 Nov 1991; with Paramax, Winnipeg, Canada, on 20 Dec 1991.

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FY 1993 RDT&E, NAVY DESCRIPTION SUMMARY

PROGRAM ELEMENT: 0604218N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Air/Ocean Equipment Engineering
PROJECT NUMBER: X0532 PROJECT TITLE: Fleet Air Ocean Equipment (FAOE)

A. (U) RESOURCES: (Dollars in thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X0532	FAOE	2,631	2,748	2,926	Cont.	Cont.

B. (U) DESCRIPTION: This project provides for the engineering development of sensors, communication interfaces, and processing and display equipment to measure, ingest, store, distribute and display atmospheric and oceanographic parameters essential to the optimum employment of naval warfare systems. Major emphasis areas include tactical workstations, the Automated Surface Observing System (ASOS), the Marine Corps Meteorological Mobile Facility (METMF), the AN/SMQ-11 satellite receiver/recorder and other satellite ground equipment, weather radars and the engineering development of new sensors such as active and passive atmospheric profilers for incorporation into the Shipboard Meteorological and Oceanographic Observing System (SMOOS). SMOOS will be developed and digitally interfaced with the Tactical Environmental Support System - TESS(3) - aboard major combatant ships.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Completed sensor engineering for SMOOS Technical Evaluation (TECHEVAL).
- b. (U) Planned (ASOS) installation engineering and support.
- c. (U) Developed data connectivity between Naval Oceanography Command primary production centers and fleet oceanography centers.

2. (U) FY 1992 PROGRAM:

- a. (U) Complete TECHEVAL and achieve Milestone III for SMOOS.
- b. (U) Begin Pre-planned Product Improvement (P3I) for SMOOS sensors.
- c. (U) Begin P3I for SMOOS/TESS(3) connectivity.

3. (U) FY 1993 PROGRAM:

- a. (U) Begin engineering development of LIDAR atmospheric profiler.
- b. (U) Continue (P3I) for SMOOS sensors.
- c. (U) Complete P3I for SMOOS/TESS(3) connectivity.
- d. (U) Continue AN/SMQ-11 and METMF system engineering and P3I.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN HOUSE: NRL-SSC, Stennis Space Center, MS; NAVELEXCEN, Vallejo, CA. NAWCAD, Indianapolis, IN CONTRACTORS: Lockheed, Austin TX

E. (U) RELATED ACTIVITIES: PE 0603207N, Air/Ocean Tactical Applications - Performs system advanced development.

F. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT P-1 166					
OPN	8,467	14,554	13,834	Cont.	Cont.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604219N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AIRBORNE ASW DEVELOPMENTS
PROJECT NUMBER: H0485 PROJECT TITLE: CV HELO Avionics

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
H0485	CV Helo Avionics	12,008	19,676	40,709	64,515	146,983

B. (U) DESCRIPTION: This program develops an Airborne Low Frequency Sonar (ALFS) and upgrades sonobuoy processing capability for the SH-60F in order to maintain and improve anti-submarine warfare (ASW) mission effectiveness against the quiet submarine threat and in shallow water environments. These improvements will also be included in the SH-60B Block II Upgrade. An operational requirement for ALFS was established in June 1985. An updated Operational Requirements Document (ORD) was approved on 16 December 1991. This project provides a dipping sonar that has demonstrated capabilities typically 3 to 6 times (square miles of ocean searched) the existing capability. This improvement will significantly increase aircraft carrier battle group (CVBG) inner zone submarine protection, providing improved CVBG survivability and operating flexibility. For the SH-60B in the middle and outer zones, ALFS will improve redetection and localization speed. In addition to long range active sonar search, ALFS will provide detection and classification of submarine threats, an embedded training capability to maintain combat ready skills, and improved sonobuoy processing capability.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- (U) ALFS Source Selection continued.
- (U) Awarded ALFS aircraft integration definition contract.
- (U) Continued Enhanced Modular Signal Processor (EMSP)

development for unique H-60 configuration.

2. (U) FY 1992 PROGRAM:

- (U) Complete ALFS source selection. Conduct Navy Program Decision Meeting and awarded ALFS contract 31 December 1991.
- (U) Commence ALFS hardware and software design and development.
- (U) Prepare and conduct Preliminary Design Review (PDR).
- (U) Initiate detailed development test planning.
- (U) Commence sonobuoy software development for integration purposes.
- (U) Commence SH-60F airframe hardware/software modification design.
- (U) Design and commence modification of Hardware/Software Integration Facility (HSIF).

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604219N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AIRBORNE ASW DEVELOPMENTS
PROJECT NUMBER: H0485 PROJECT TITLE: CV HELO Avionics

3. (U) FY 1993 PLANS:

- a. (U) ALFS system development:
 - Continue hardware/software design and development.
 - Conduct ALFS Critical Design Review (CDR).
 - Continue ALFS/UY8-2 integration.
 - Commence ALFS/UY8-2 system level testing.
- b. (U) Award Airframe Integration Contract.
 - Conduct Airframe PDR.
 - Conduct Airframe CDR.
 - Complete HSIF modifications.
 - Commence airframe hardware/software modifications.
- c. (U) Commence Contractor and Government development testing.

4. (U) PROGRAM TO COMPLETION:

- a. (U) Commence system integration testing.
- b. (U) Commence environmental testing.
- c. (U) Commence reliability testing.
- d. (U) Complete aircraft integration and testing.
- e. (U) Complete TECHEVAL.
- f. (U) Complete OPEVAL.
- g. (U) Correct testing deficiencies.
- h. (U) Commence production.

D. (U) WORK PERFORMED BY: IN-HOUSE: NATC, Patuxent River, MD; NADC, Warminster, PA; NAC, Indianapolis, IN; NWSC, Crane, IN. CONTRACTORS: Hughes Aircraft, Fullerton, CA for ALFS. Sikorsky Aircraft Division, Stratford, CT for integration; AT&T, Greensboro, NC for UY8-2.

E. (U) COMPARISON WITH FY 1992/93 PRESIDENT'S BUDGET:

- 1. (U) Technology changes: None.
- 2. (U) Schedule Changes:
 - ALFS contract award delayed pending decision to use UY8-2 signal processor.

3. (U) Cost Changes +\$17.7M:

- Increased cost for airframe integration.
- Increased UY8-2 non-recurring engineering costs.
- Increased cost for Risk Reduction Measures implemented following

Independent Risk Assessment Team recommendations to include:

- (a) Increased software Independent Verification and Validation.
- (b) Increased test assets.
- (c) Increased formalized software reviews.

F. (U) PROGRAM DOCUMENTATION: Operational Requirements Document approved 12/91; Acquisition Plan approved 11/91; Test and Evaluation Master Plan in final approval cycle as of 1/92; Cost and Effective Analysis completed 12/91; Integrated Program Summary approved 12/91.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604219N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AIRBORNE ASW DEVELOPMENTS
PROJECT NUMBER: H0485 PROJECT TITLE: CV HELLO Avionics

G. (U) RELATED ACTIVITIES: Program Element (PE) 0604212N, H1707 LAMPS
Improvements; PE 0604507N, Navy Standard Signal Processor

H. (U) OTHER APPROPRIATION FUNDS: (DOLLARS IN THOUSANDS)

	FY 1991	FY 1992	FY 1993	TO	TOTAL
(U) PROCUREMENT	ACTUAL	ESTIMATE	ESTIMATE	COMPLETE	PROGRAM
APPN P-1					
APN-1					

Production to begin in FY 1997.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE

J. (U) MILESTONE SCHEDULE:

MSII 12/91 (Successfully completed 16 Dec 91).
MSIII 9/96

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604221N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: P-3 Modernization Program

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
H1152	P-3 Sensor Integration	11,426	8,977	8,258	Cont.	Cont.
H1588	P-3 Update IV Avionics	<u>57,025</u>	<u>30,574</u>	<u>27,215</u>	Cont.	Cont.
	TOTAL	68,451	39,551	35,473	Cont.	Cont.

B. (U) DESCRIPTION: This program provides upgrades to the P-3C's defensive and offensive systems to enhance its surface and subsurface tracking, classification, and attack capability. The P-3C Sensor Integration (H1152) Project provides improved acoustic software to process more advanced active and passive sonobuoys and increase the operational capability of the P-3C Update III Acoustic System by taking advantage of its software programmability. The P-3 Update IV Avionics (H1588) Project is developing the next upgrade to the P-3 mission avionics suite. The new suite will incorporate new sensors, communicators and a substantial increase in flexibility through a distributed bus architecture that significantly increases processing power while accepting the high data rate sensors. It provides workload sharing among crew stations, allows for ease of incorporating future sensors, and improves aircraft survivability in an increasingly hostile environment through greater standoff targeting and classification ranges. The system improves early alert to a broad range of emerging threat sensors, and significantly increases the acoustic processing capacity of the aircraft by integrating the Enhanced Modular Signal Processor (EMSP) into the data bus system.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604221N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: P-3 Modernization Program

PROJECT NUMBER: H1152

PROJECT TITLE: P-3C Sensor Integration

C. (U) DESCRIPTION: Primarily a software upgrade, this project will increase the operational capability of the P-3C UPDATE III Acoustic System by integrating the current hardware/software configuration with advanced sonobuoys and detection algorithms.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) POST CHANNEL EXPANSION (POST CHEX) and Air Common Acoustic Processing (ACAP) (release 5.0) Development Testing (DT) completed.

b. (U) Post CHEX and ACAP (release 5.0) Operational Testing (OT) initiated.

2. (U) FY 1992 PROGRAM:

a. (U) Complete Post CHEX and ACAP (release 5.0) OT.

b. (U) Generate requirements concept and software specification for the incorporation of the Acoustic Intercept System (AIS), ACAP (release 8.0).

c. (U) Modify baseline Tactical Mission Software (TMS) design specification for Tactical Computers.

d. (U) Develop requirements and design specifications for BROADBAND (processing & display).

3. (U) FY 1993 PLANS:

a. (U) Continue development of TMS (designation A4.8)

b. (U) Continue development of AIS

c. (U) Continue development of BROADBAND (processing and display)

4. (U) PROGRAM TO COMPLETION: (U) This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NADC, Warminster, PA; NATC, Patuxent River, MD. CONTRACTORS: IBM, Manassas, VA; Computer Sciences Corporation, Warminster, PA; Pacer, Bedford, MA; UNISYS, St. Paul, MN.

F. (U) RELATED ACTIVITIES: PROGRAM ELEMENT 0604261N - Acoustic Search Sensors; developing software and acoustic algorithms.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY91 ACTUAL	FY92 ESTIMATE	FY93 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT:					
APPN/P-1					
APN-5/#44	19,260	4,440	9,862	40,626	81,655

H. (U) INTERNATIONAL COOPERATION AGREEMENT: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604221N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: P-3 Modernization Program

PROJECT NUMBER: H1588

PROJECT TITLE: P-3 Update IV Avionics



POPULAR NAME: UPDATE IV

A. (C) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program Milestones		NPDM 2/92		
Engineering Milestones			Del A/C 6/93	Cont
T&E Milestones			DT/OT IIA 7/93	Cont
Contract Milestones				
BUDGET (\$K)	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
Major Contract	40,441	11,155	15,681	Cont
Support Contract	3,061	2,650	2,450	Cont
In-House Support	11,221	12,906	7,263	Cont
GFE/ Other	2,302	3,863	1,821	Cont
TOTAL	57,025	30,574	27,215	Cont

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604221N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: P-3 Modernization Program

PROJECT NUMBER: H1588

PROJECT TITLE: P-3 Update IV Avionics

B. (U) DESCRIPTION: The goal of this project is to replace the entire mission avionics suite of the P-3 aircraft with a new system which significantly enhances the P-3 aircraft role in supporting the naval battle group. The system will combat the emerging third world/limited operations surface, subsurface and air threats with simultaneous, multi-mission capabilities. The modification program includes total systems integration of existing and newly developed sensors into a fail safe, distributed processing system architecture. High resolution, color enhanced generic workstations provide for operator workload sharing and in-flight mission re-configuration. The resulting system decreases operator workload, improves operational effectiveness and increased ease of handling, interpretation and analysis through automated data fusion of aircraft and external data (via digital satellite communications). Multi-sensor tracking and targeting is provided to the battle group. Significant advances in non-acoustic procession capacity are provided by an improved AN/APG-137 Imaging Radar and Infrared Detection Systems and a new AN/ALR-66(V)5 Electronic Support Measures which provide automatic detection, classification, tracking, and targeting. The program also provides an order of magnitude increase in acoustic procession capacity and coverage by integration of the AN/UYK-2-Enhanced Modular Signal Processor (EMSP SEM-E) with high technology, post-data processing and display. The resulting increase in sensitivity and recognition differential against the latest generation nuclear and diesel submarines will meet the projected year 2000 threat. First Article training devices are required for P-3 Update IV avionics, maintenance training, and aircrew Weapons Systems Trainers.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLAN:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Commenced development of UYS-2 Standard Electronic Module-E.
- b. (U) Commenced Contractor Software Developmental Testing.

2. (U) FY 1992 PROGRAM:

- a. (U) Complete Digital Processing/Display Generation Unit software coding.
- b. (U) Complete integration of UYS-2 SEM-E.
- c. (U) Certification of Patrol Avionics Test Laboratory (PATL).
- d. (U) Commence Boeing flight test of Engineering Manufacturing Development aircraft.
- e. (U) Commence Contractor testing of Update IV system in aircraft.

3. (U) FY 1993 PLANS:

- a. (U) Preproduction Prototype Aircraft Delivery.
- b. (U) Complete Contractor testing of Update IV system in aircraft.
- c. (U) Commence Development Testing/Operational Testing-IIA.

4. (U) PROGRAM TO COMPLETION: This is a continuing program

D. (U) WORK PERFORMED BY: IN-HOUSE: NADC, Warminster, PA; NATC, Patuxent River, MD. CONTRACTORS: Boeing Aerospace Co., Seattle, WA; Texas Instruments, Inc., Dallas, TX; AT&T, Whippany, NJ; CAE, Silver Spring, MD.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

- 1. (U) TECHNOLOGY CHANGES: Not Applicable.
- 2. (U) SCHEDULE CHANGES: Due to the restructure of the Update IV program, a Milestone III decision has been delayed until 4Q95.
- 3. (U) COST CHANGES: Not Applicable.

FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604221N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: P-3 Modernization Program

PROJECT NUMBER: H1588

PROJECT TITLE: P-3 Update IV Avionics

F. (U) PROGRAM DOCUMENTATION: Test Evaluation Master Plan 5/87; Acquisition Plan 6/87; Navy Development Concept Paper 7/87; Program Change Approval Document 1/90.

G. (U) RELATED ACTIVITIES: Not Applicable.

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) TEST AND EVALUATION: DT/OT-IIA 7/93

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604230N

BUDGET ACTIVITY: 5

PROGRAM ELEMENT TITLE: Warfare Support Systems

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X1752	TESS	2,355	2,461	2,344	Cont.	Cont.
X1779	ROTHR	9,367	0	0	Cont.	Cont.
TOTAL		11,722	2,461	2,344		

B. (U) DESCRIPTION: This program element develops shipboard and shore based Tactical Environmental Support Systems (TESS) that predict and assess atmospheric and oceanographic effects on tactical systems and a relocatable over-the-horizon-radar system.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604230N

BUDGET ACTIVITY: 5

PROGRAM ELEMENT TITLE: Warfare Support Systems

PROJECT NUMBER: X1752 PROJECT TITLE: Tactical Environmental Support System

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X1752	TESS ENG	2,355	2,461	2,344	Cont.	Cont.

B. (U) DESCRIPTION: This project develops the Navy's computer-based tactical shore and shipboard capability used to predict and assess the impact of the atmospheric and oceanographic environment on the performance of weapon and sensor systems. Data will be ingested from atmospheric and oceanographic remote sensing satellites, regional oceanographic centers, World Meteorological Organization civilian reporting broadcasts, local observations, and data bases. Through command and control interfaces, the Battle Group commander will merge atmospheric and oceanographic information with other essential intelligence for optimum employment of available platforms, sensors, and weapons.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Completed OPEVAL aboard USS THEODORE ROOSEVELT (CVN 71) and achieved Milestone IIIA.

b. (U) Began integration of software on TESS(3) Engineering Development Model #2 (EDM-2) at NRL, Stennis Space Center.

2. (U) FY 1992 PROGRAM:

a. (U) Complete FOT&E; achieve Milestone IIIB.

b. (U) Begin Pre-planned Product Improvement (P3I) program for shipboard interfaces.

c. (U) Continue software integration on EDM-2.

3. (U) FY 1993 PLANS:

a. (U) Continue software integration on EDM-2.

b. (U) Begin integration of P3I applications software.

c. (U) Continue P3I program for shipboard interfaces.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Stennis Space Center, MS; NAVELXECN, Vallejo, CA. CONTRACTORS: Lockheed, Austin, TX.

E. (U) RELATED ACTIVITIES: PE 0604218N, Air Ocean Equipment Engineering - interface engineering; PE 0305111N, Weather Service - Data base management; PE 0603704N, ASW Oceanography - Satellite data processing software; PE 0603207N, Air Ocean Tactical Applications - provides models.

F. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT P-1 166					
OPN	29,116	15,542	16,994	Cont.	Cont.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENT: None.

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FY 1993 RDT&E NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N

BUDGET ACTIVITY: 5

PROGRAM ELEMENT TITLE: Tactical Command Systems (TCS)

A. (U) RESOURCES: (Dollars in thousands)

Project Number	Title	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X0486	ASW Operations Center Upgrade	10,643	11,655	5,963	Cont.	Cont.
X0709	Navy Tactical Command Systems Afloat	9,532	13,292	7,264	Cont.	Cont.
X1144	NCCS Ashore Nodes	1,958	0	0	0	69,850
X2009	OSIS Baseline Upgrade (OBU)	12,494	2,364	2,820	Cont.	Cont.
X2041	Operations Support System (OSS)	11,988	8,258	8,896	Cont.	Cont.
	Total	46,615	35,569	24,943		

B. (U) DESCRIPTION: This program develops and upgrades the Navy's command and control information management systems supporting commanders afloat and ashore. Included among these C2 systems are: the unified command centers of CINCPAC and CINCLANT, the Navy Command Center, the Fleet command centers of CINCLANTFLT, CINCPACFLT and CINCUSNAVEUR, the Submarine Operating Authority (SUBOPAUTH) command center, the command centers supporting the Anti Submarine Warfare (ASW) Sector Commander, the Fleet Ocean Surveillance Information Centers (FOSIC) and Fleet Ocean Surveillance Information Facilities (FOSIF), and the Tactical Flag Command Centers (TFCC) afloat. These projects develop information processing and display systems for afloat and ashore commanders providing decision makers the ability to make rapid, informed tactical decisions. TCS develops systems which fuse tactical data from shipboard organic sensors, and ashore and space-based non-organic sensors. TCS includes total system definition of each of the major afloat and ashore command centers and the integration of warfare systems within them. The functions provided by TCS are consistent with the Navy's Over-The-Horizon Detection, Classification, and Targeting Architecture.

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FY 1993 RDT&E NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N

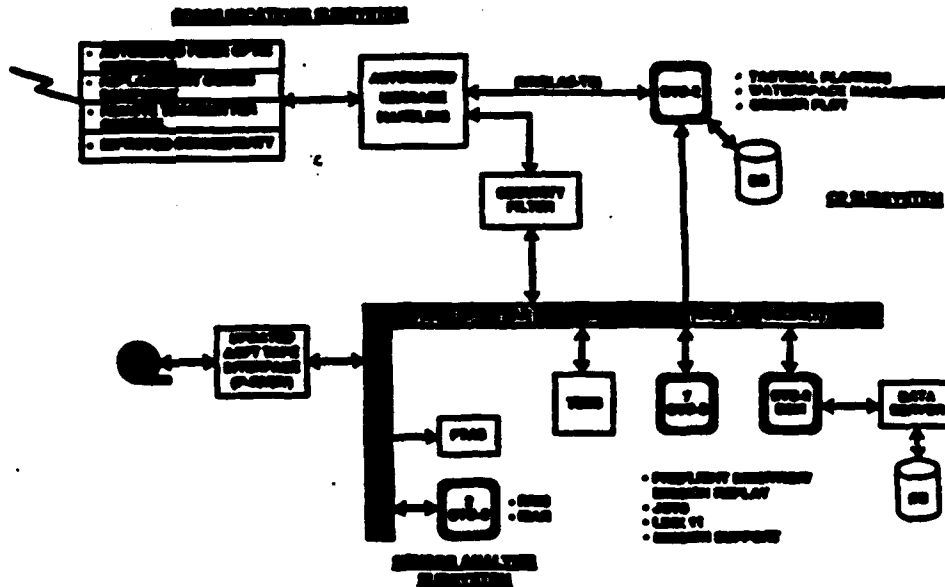
BUDGET ACTIVITY: 5

PROGRAM ELEMENT TITLE: Tactical Command Systems (TCS)

PROJECT NUMBER: X0486

PROJECT TITLE: Anti-Submarine Warfare
Operations Center

ASWOC ARCHITECTURE



POPULAR NAME: ASWOC

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	TO COMPLETE
PROGRAM				
MILESTONES				MSIIIA/IIIB
ENGINEERING	TEST SYSTEM	TEST SYSTEM		
MILESTONES	(NESEA, ST. INIGORS)	(ASWOC BRUNSWICK)		Continuing
T&E				
MILESTONES			DT IIA	OTIIA/IIIB
CONTRACT	Various Milestones to support an Evolutionary Acquisition.			
MILESTONES	Integration by NESEA St. Inigors.			Continuing
BUDGET				TOTAL PROGRAM
(\$000)	FY 1991	FY 1992	FY 1993	TO COMPLETE
MAJOR				
CONTRACT	9.872	8.751	5.315	Continuing
SUPPORT				
CONTRACT	60	224	224	Continuing
IN-HOUSE				
SUPPORT	711	2.680	424	Continuing
GFE/				
OTHER	0	0	0	Continuing
TOTAL	10.643	11.655	5.963	Continuing

* Congressional Language directed \$2,974K from PE 0604231N for FY92 OTH-T efforts. Funds are provided from this project.

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FY 1993 RDT&E NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N

BUDGET ACTIVITY: 5

PROGRAM ELEMENT TITLE: Tactical Command Systems (TCS)

PROJECT NUMBER: X0486

PROJECT TITLE: Anti-Submarine Warfare
Operations Center

B. (U) DESCRIPTION: The Antisubmarine Warfare Operations Centers (ASWOC) are nodes of the Navy Command and Control System (NCCS) ashore and provide the Sector Commander with the capability to plan and execute his assigned missions, including ASW, Anti-Surface Warfare, Over-the-Horizon-Targeting (OTH-T), maritime surveillance and special operations. The ASWOC system was established to support the data reduction of the mission tapes generated by the computerized P-3C aircraft. The ASWOCs currently provide tactical equipment and facilities for mission planning, command and control, post-flight sensor analysis and mission reporting to naval forces afloat. The ASWOC C Modernization will modernize message and data processing capabilities to support simultaneous aircraft missions, improve systems availability, interface with NCCS Ashore theater data bases, improve systems interoperability with U.S. and Allied naval operating forces, and support new aircraft capabilities. This program assures the existing ASWOC system remains interoperable with updated aircraft, sensors and weapons systems. OTH-T encompasses the ability to conduct long-range, real time targeting using tactical and intelligence sources which are achieved by maintaining an interoperable relationship among sensors, communications, information processing nodes, navigation systems, and weapon control systems.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS

1. (U) FY 91 ACCOMPLISHMENTS

- a. (U) Developed, tested, installed Upgraded ASWOC Tape Operations Systems to support P-3 Series and S-3 aircraft.
- b. (U) Completed development/integration of Automated Data Processing (ADP) components to meet ASWOC Keflavik Combined Operations Center requirements (Objective I Incremental Fleet Release 1.0.1).
- c. (U) Completed development, test, and first operational deployment of the ASWOC Transition System.
- d. (U) Completed test and evaluation of Objective I Incremental Fleet Release 1.0.2: mission support aids (computer aided search) software.
- e. (U) Completed initial functional, performance and security testing of the UYC-8 Security Filter.
- f. (U) Completed development of Objective I Incremental Fleet Release 1.0.3 software components: Safety of Flight, System Management Shell, Preflight Insertion software (P-3C).
- g. (U) Completed assessment of NCCS Ashore Data Server System for integration into Objective I Incremental Fleet Release 1.0.3 software.
- h. (U) Completed ADP Security Accreditation Plans and associated engineering analysis for ASWOC COC Keflavik and ASWOC Objective I.

2. (U) FY 1992 PROGRAM (ASWOC)

- a. (U) Complete installation and training at designated ASWOCs for Objective I Incremental Fleet Release 1.0.2: mission support aids (computer aided search).
- b. (U) Complete integration, testing, documentation, and delivery to first operational site (ASWOC Brunswick) of Objective I Incremental Fleet Release 1.0.3: Data Server, Security Management Shell, Safety of Flight, Preflight Insertion Data Software to support P-3C aircraft.
- c. (U) Develop DTC-2 software for replay of Tactical Mission Extract tapes from P-3 aircraft.
- d. (U) Develop, test and install ASWOC ES901 software updates to support P-3C I4.7 release.

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FY 1993 RDT&E NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N

BUDGET ACTIVITY: 5

PROGRAM ELEMENT TITLE: Tactical Command Systems (TCS)

PROJECT NUMBER: X0486

**PROJECT TITLE: Anti-Submarine Warfare
Operations Center**

- e. (U) Capture/integrate United States Message Text Format (USMTF) message parsing and generation software, Data Server Software updates, word processing software, remote communications control software, Joint Operations Tactical System (JOTS) Unified Build, and NCCS Government Off-the-Shelf Software (GOTS) updates.
- f. (U) Initiate development of P-3 (CP-2044 release) support software.
- g. (U) Develop/integrate automated message processing software to support on-line AUTODIN, air-to-ground, and point-to-point connectivity, SATCOM (TADIXS A AND B).
- h. (U) Develop/integrate and test SATCOM DTC-2 interfaces and control software.
- i. (U) Support ASW GLOBIXS demonstration of waterspace management software.
- j. (U) Develop/integrate DTC-2 Link 11 software.
- k. (U) System testing, documentation, and installation at first operational site of Incremental Fleet Release 1.0.4 to add: Data Server System updates, communications automation software, mission support aids, Inverse Synthetic Aperture Radar analysis, Aircrew Brief, Aircraft Status, ASWOC Tape Operations and Preflight Insertion Data software updates, Mission Replay (P-3C).
 - 1. Develop OTH-T Airborne Sensor Interface System (OASIS) targeting suites for the EP-3 (Outlaw Story Teller) and S-3 (Outlaw Viking) and field the SH-60B (Outlaw Seahawk).
 - m. Conduct Radiant Outlaw feasibility study (LADAR for target identification and location).
 - n. Provide fleet system engineering to validate specific sensor-to-shooter targeting delivery paths within OTH-T architecture.
 - o. Conduct certification testing of OTH-T systems at reconfigurable land-based test site in accordance with OPNAVINST 9410.5.
- 3. (U) FY 1993 PLANS:
 - a. (U) Complete installation of Incremental Fleet Release 1.0.4 at designated ASWOCs.
 - b. (U) Capture/integrate Data Server System updates, ASW Tactical Decision Aids, Navy Tactical Command System - Afloat updates, and GOTS updates.
 - c. (U) Integrate acoustic and emitter data bases into data server software.
 - d. (U) Develop/integrate communications technical control functions.
 - e. (U) Development of mission replay and preflight insertion data software updates.
 - f. (U) Continue development/integration of Link 11 software.
 - g. (U) Complete system testing, documentation, training and installation at the first operational site for Incremental Fleet Release 1.0.5 to add: Data Server updates, Communications Automation updates, Mission Replay updates, Tape Operations updates, Preflight Insertion Data software updates, acoustic/emitter data bases, correlation software.
 - h. (U) Complete formal DT IIA in preparation for Operational Test and Evaluation in first quarter FY94.
 - i. (U) Achieve ADP security accreditation.
 - j. (U) Achieve AUTODIN Category III certification

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FY 1993 RDT&E NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N

BUDGET ACTIVITY: 5

PROGRAM ELEMENT TITLE: Tactical Command Systems (TCS)

PROJECT NUMBER: X0486

PROJECT TITLE: Anti-Submarine Warfare
Operations Center

4. PROGRAM TO COMPLETION: This is a continuing program. Complete OT IIA and achieve a MS IIIA decision in FY94. Deliver additional incremental updates to provide: Link 11 and TADIXS B processing capability, improved tactical decision aids, environmental data interface; and meet required operational system performance thresholds to achieve a MS IIIB decision in FY96. Provide continuing updates to sustain interoperability as new aircraft, sensors and ASW systems capabilities are developed.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVELEXSYSENGACT St. Inigoes, MD; NAVOCEANSYSCEN San Diego, CA; NAVELEXSYSCENS Charleston, SC and Vallejo, CA; NAVAIRDEVCON, Warminster, PA; Navy Center of Tactical Systems Interoperability, San Diego, CA. CONTRACTORS: Potomac Systems Engineering, Inc. Annandale, VA; Inter-National Research Institute, Arlington, VA; Booz-Allen Hamilton, Bethesda, MD; Digital System Corp., Walkersville, MD; MITECH Corp., Arlington, VA; Systems Technology & Applied Research Corp, Falls Church, VA; SAIC, Inc., McLean, VA.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: None.
2. (U) SCHEDULE CHANGES: None.
3. (U) COST CHANGES: None.

F. (U) PROGRAM DOCUMENTATION:

Operational Requirement #117-094-86	08/86	ASW Master Plan	03/89
Computer Resources Life Cycle	08/90	Program Change	08/90
Management Plan (CRLCMP)		Approval Document (PCAD)	
Decision Coordinating Paper (DCP)	10/90	ASWOC TEMP #911-2	03/91
Acquisition Plan (A/P) #90-15-1	06/91	(Draft)	

G. (U) RELATED ACTIVITIES:

PE 0603708N: ASW Signal Processor: The ASW Signal Processors aboard P-3 and S-3 type aircraft generate acoustic data tapes for analysis by the ASWOC Fast Time Analyzer System (FTAS).

PE 0604261N: S-3 Weapon System Improvement: ASWOC maintains interoperability with S-3 weapon systems and future improvements.

PE 0604219N: Airborne ASW Developments: ASWOC maintains support for new airborne ASW capabilities developed for P-3 and S-3 aircraft.

PE 0604221N: P-3 Modernization: ASWOC maintains interoperability with, and fully supports P-3 system changes and enhancements.

PE 0204311N: Surveillance Direction System: ASWOC maintains interoperability with the Undersea Surveillance System Program and is a subelement of project X0766.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands):

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
PROCUREMENT					
OPN/#102/T4371/T4380/ T4776	2,314	14,934	25,250	CONT.	CONT.
OPN #65/WH046/WH776	0	8,384	17,897	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

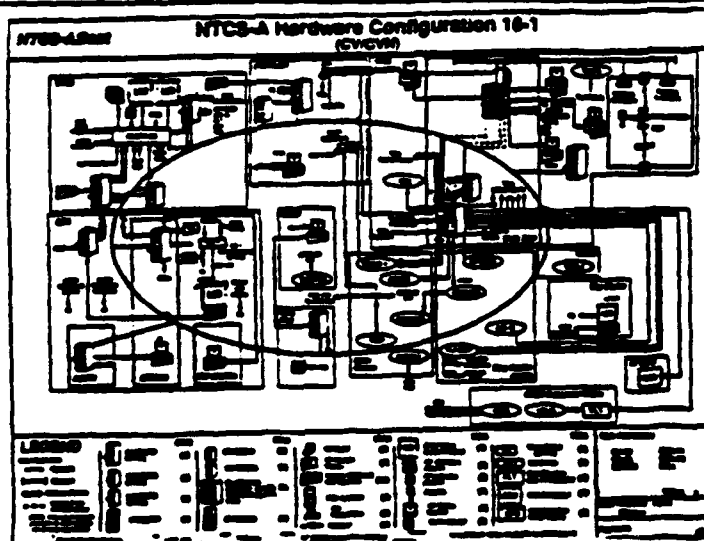
J. (U) TEST AND EVALUATION: Not applicable.

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FY 1993 ROT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N BUDGET ACTIVITY: 5
 PROGRAM ELEMENT TITLE: TACTICAL COMMAND SYSTEM (TCS)
 PROJECT NUMBER: X0709 PROJECT TITLE: Navy Tactical Command System
 Afloat (NTCS-A)



POPULAR NAME: NAVY TACTICAL COMMAND SYSTEM-AFLOAT (NTCS-A)

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program		DT-IIA	DT-IIB	
Milestones	NFDM	OT-IIA	OT-IIB	CONTINUING
Engineering	SOFTWARE	SOFTWARE	SOFTWARE	CONT. SOFTWARE
Milestones	UPDATE	UPDATE	UPDATE	ANNUAL UPDATES
T&E		DT-IIB	DT-IIC	
Milestones		OT-IIB	OT-IIC	CONTINUING
Contract	EXERCISE	AWARD NEW	EXERCISE	AWARD NEW
Milestones	OPTION	CONTRACT	OPTION	CONTRACT
				PROGRAM TOTAL
Budget (\$K)	FY 1991	FY 1992	FY 1993	TO COMPLETE
Major				
Contracts	4.331	7.542	2.710	CONTINUING
Support				
Contracts	-0-	-0-	-0-	CONTINUING
In-House				
Support	3.717	3.771	3.375	CONTINUING
GFE/				
Other	1.484	1.979	1.179	CONTINUING
TOTAL	9.532	13.292*	7.264	CONTINUING

* FY92 totals include \$2M for Battle Group Passive Horizon Extension System Surface Terminal (BGPHE-SST) and \$1.2M for Common High Bandwidth Data Link Surface Terminal (CHBDL-ST). These two projects will be funded in P.E. 0604721N in FY93.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231M

BUDGET ACTIVITY: 5

PROGRAM ELEMENT TITLE: TACTICAL COMMAND SYSTEM (TCS)

PROJECT NUMBER: X0709

**PROJECT TITLE: Navy Tactical Command System
Afloat (NTCS-A)**

B. (U) DESCRIPTION: The Navy Tactical Command System - Afloat (NTCS-A) program consolidates the formerly identified Tactical Flag Command Center (TFCC), Joint Operational Tactical System (JOTS), Afloat Correlation System (ACS) and Electronic Warfare Coordination Module (EWCN) programs and provides a tactical command, control, communications and intelligence (C3I) system to U.S. Navy Ships. This system provides a common C3I baseline for Numbered Fleet Commanders (NFC), Officers in Tactical Command (OTC), Composite Warfare Commanders (CWC), Subordinate Warfare Commanders (SWC), Commander Amphibious Task Force (CATF), Commander Landing Force (CLF) and Commanding Officers/Tactical Action Officers (CO/TAO). Efforts include design integration and test of Tactical Decision Aids (TDA) and Tactical Intelligence Analytical Aids, in a multi-level secure mode, to provide the Battle Group/Force Commanders with warfighting Command and Control capabilities. Improved capabilities are planned for fleet release on an annual basis with the identical computer program being installed on all Navy platforms. Examples of these developments include:

1. (U) Advanced correlator-tracker which consists of algorithms that evaluate new data with prior data to (1) determine platform and (2) track that platform movements within the tactical area of interest.

2. (U) Collection management which collects and files current and historical data relative to tactical targets and uses that data to evaluate sensors and identify potential collection systems.

3. (U) Counter-targeting/counter-surveillance information on designated targets.

4. (U) All source (i.e., SCI, GENSER) correlation of tactical targeting data.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Initiated design, development, integration and test of additional TDA's counter-targeting/counter-surveillance, communications countermeasures, tactical intelligence analytical tools, multi-level secure network (SCI/GENSER) and collection management.

b. (U) Continued development and test of the Advanced Correlator-Tracker, integration and test of C3I TDA's into the software baseline, developmental and operational testing of the annual unitary software release and integration and test of emergent fleet C3I TDA's.

c. (U) Completed integration of current correlator-tracker into the Land Based Test Facility (LBTf), interfaced with the Navy Warfare Tactical Data Base (NWTDB), transitioned TFCC Information Management System (TIMS) into the NTCS-A baseline hardware/software, and integrated and deployed the annual unitary software release.

2. (U) FY 1992 PROGRAM:

a. (U) Initiate development and integration testing of the correlator - tracker upgrades for insertion into the unitary software baseline.

b. (U) Initiate developmental testing of the all source (SCI/GENSER) security network and developmental integration and testing of the FY 1993 unitary software release.

c. (U) Continue design, development, integration and testing of additional TDA's for counter-targeting/counter-surveillance, communications countermeasures tactical intelligence analytical tools and collection management.

d. (U) Develop and test upgrades to the Advanced Correlator-Tracker.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N

BUDGET ACTIVITY: 5

PROGRAM ELEMENT TITLE: TACTICAL COMMAND SYSTEM (TCS)

PROJECT NUMBER: X0709

PROJECT TITLE: Navy Tactical Command System
Afloat (NTCS-A)

- e. (U) Integrate and test C3I TDAs in the software baseline.
- f. (U) Conduct developmental and operational testing of the annual unitary software release.
- g. (U) Integrate and test emergent fleet C3I TDA's.
- h. (U) Complete transition of Prototype Ocean Surveillance Terminal (POST) into the NTCS-A baseline.
- i. (U) Initiate development of a BGPRES (XM-2) prototype.
- j. (U) Initiate fabrication of initial CHEDL-ST system. Initiate efforts to establish a land based test site.

3. (U) FY 1993 PLANS:

- a. (U) Initiate and complete Operational Testing and deployment of the all source (SCI/GENSER) security network.
- b. (U) Conduct developmental integration and testing of the FY 1994 unitary software release.
- c. (U) Continue design, development, integration and test of additional TDA's for counter-targeting/counter-surveillance, communications countermeasures, tactical intelligence analytical tools and collection management.
- d. (U) Develop and test upgrades to the Advanced Correlator-Tracker, integrate and test C3I TDAs in the software baseline, conduct developmental and operational testing of the annual unitary software release and integration and testing of emergent fleet C3I TDA's.
- e. (U) Complete integration of current correlator-tracker into the annual unitary software release and integration and deployment of the annual unitary software release.
- f. (U) Continue NTCS-A 3.0 development to include full SCI Joint Operational Tactical System/Naval Intelligence Processing System (JOTS/NIPS). Merge functionality and video distribution capabilities of Closed Circuit TV (CCTV) into NTCS-A. Test NTCS-A 3.0 at sea and complete the integration of CCTV into NTCS-A. Test SAFENET II LAN at sea with NTCS-A 3.0.
- g. (U) Integrate all source video into workstation, develop, integrate and test single workstation with radar and JOTS II pictures merged. Provide NTCS video into workstation (i.e., TV/Cable station).
- h. (U) Absorb functionality of Cryptologic Combat Support Console (CCSC). Integrate XPLRS into NTCS-A 3.0.
- i. (U) Develop new interactive TDA's, provide replay capability via EXABYTE tapes.
- j. (U) Add digital chart of the world mapping products to workstation.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN HOUSE: NAVOCEANSYSCEM, San Diego, CA, COMOPTEVFOR, Norfolk, VA, NRL, Washington, DC and NADC, Warminster, PA.
CONTRACTORS: INRI, Yorktown, VA, Lockheed, Austin TX., SAIC, Vienna, VA., and Tiburon Systems, San Jose, CA.

E. (U) COMPARISON WITH FY 1992/93 PRESIDENT'S BUDGET:

- 1. TECHNOLOGY CHANGES: None.
- 2. SCHEDULE CHANGES: None.
- 3. COST CHANGES: None.

F. (U) PROGRAM DOCUMENTATION: TPCC TEMP 240-2 (June 1990), JOTS TEMP 240-10 (August 1989) and ADM (April 1991)

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: TACTICAL COMMAND SYSTEM (TCS)
PROJECT NUMBER: X0709 PROJECT TITLE: Navy Tactical Command System
Afloat (NTCS-A)

G. (U) RELATED ACTIVITIES: Program Element 0205670N, Tactical Intelligence Processing Support, Shipboard Tactical Intelligence Processing. STIP allows access to the centralized intelligence database file.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ESTIMATE	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROG.
APPN/P-1					
OPN #82	31,688	30,866	39,828	Cont.	Cont.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: Not Applicable.

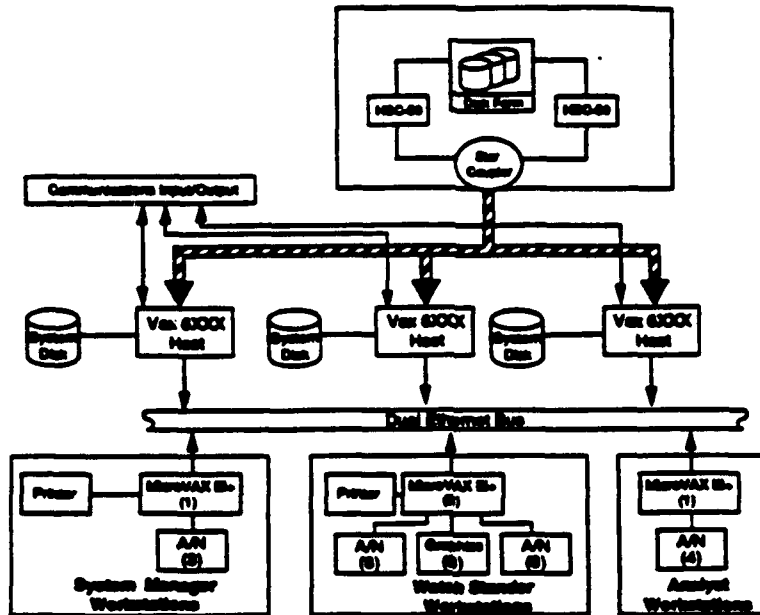
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FY 1993 RDT&E NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N

BUDGET ACTIVITY: 5

PROGRAM ELEMENT TITLE: Tactical Command Systems (TCS)

PROJECT NUMBER: X2009 PROJECT TITLE: Ocean Surveillance Information System
Baseline Upgrade (OSU)

POPULAR NAME: OSIS BASELINE UPGRADE (OSU)

A. (U) SCHEDULE/BUDGET INFORMATION: (DOLLARS IN THOUSANDS)

SCHEDULE	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program	ARB	NPDM	ARB	CONTINUING
Milestones				
Engineering	OPEVAL	SDR	SDR	CONTINUING
Milestones	Phase II			
T&E		DT-IIC	DT-IID	CONTINUING
Milestones		OT-IIC	OT-IID	
Contract		Phase II Complete		CONTINUING
Milestones		Phase III Commence		

BUDGET (\$000)	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
Major Contract	6,606	400	350	CONTINUING
Support Contract	0	0	0	CONTINUING
In-House Support	5,738	1,814	2,270	CONTINUING
GFE	150	150	200	CONTINUING
Other				
Total	12,494	2,364	2,820	CONTINUING

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FY 1993 RDT&E NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N

BUDGET ACTIVITY: 5

PROGRAM ELEMENT TITLE: Tactical Command Systems (TCS)

PROJECT NUMBER: X2009 PROJECT TITLE: Ocean Surveillance Information System
Baseline Upgrade (OSU)

B. (U) DESCRIPTION: The Ocean Surveillance Information System (OSIS) is a subsystem of the Navy Command and Control System (NCCS) ashore. OSIS provides for the analysis of intelligence information from multiple sources to produce a comprehensive report of foreign forces and potential hostile activity. The system provides positional data and operational intelligence to commanders at all levels. It consists of three Fleet Ocean Surveillance Information Centers (FOSICs), two Fleet Ocean Surveillance Information Facilities (FOSIFs), a software support activity, and a training site. OSIS functions encompass establishing and maintaining technical characteristics and performance data on hostile weapons platforms systems, collecting non-organic data from ashore and afloat sensors, developing an all-source tactical picture, and analyzing intelligence information. The data derived from this process is disseminated as an Operational Intelligence (OPINTEL) product to the operating forces for tactical threat warnings, decision making support, and support of Over-the-Horizon-Targeting.

(U) OSIS Baseline Upgrade (OSU) uses the Joint Logistics Commander's Guidance of March 1987 on Evolutionary Acquisition (EA) as the strategy for future software development which includes a plan for incremental achievement of desired capability building on the core system provided by OSU Phases I and II. The OSU Phase III EA strategy will provide a mechanism for adding future capabilities including the incorporation of proven fleet initiated prototypes.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Completed OT-IIA OPEVAL corrections with OSU Phase II Release

2.0.

- b. (U) Completed software development of OSU Phase II Trusted Port.
- c. (U) Continued workstation upgrades and evaluation of prototype

functional enhancements.

2. (U) FY 1992 PROGRAM:

- a. (U) Conduct DT-IIC.
- b. (U) Conduct OPEVAL OT-IIC.
- c. (U) Begin workstation upgrade.
- d. (U) Continue evaluation of prototype functional enhancements.
- e. (U) Complete Phase II.
- f. (U) Commence Phase III software development.

3. (U) FY 1993 PLANS:

- a. (U) Conduct DT-IID.
- b. (U) Conduct OT-IID.
- c. (U) Begin to develop prototype and update baseline.
- d. (U) Continue evaluation of prototype functional enhancements.
- e. (U) Continue workstation upgrade.
- f. (U) Continue Phase III software development.

4. (U) PROGRAM TO COMPLETION:

- a. (U) This is a continuing program.
- b. (U) Continue evaluation of prototype functional enhancements.
- c. (U) Continue Phase III software enhancements.

FY 1993 RDT&E NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N BUDGET ACTIVITY: 5
 PROGRAM ELEMENT TITLE: Tactical Command Systems (TCS)
 PROJECT NUMBER: X2009 PROJECT TITLE: Ocean Surveillance Information System
 Baseline Upgrade (OSU)

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVOCEANSYSCEM, San Diego, CA;
 NSWC, Dahlgren, VA CONTRACTOR: TRW Inc., Merrifield, VA

E. (U) COMPARISON WITH FY 1992/93 PRESIDENT'S BUDGET:

1. (U) Technology Changes: None.
2. (U) Schedule Changes: None.
3. (U) Cost Changes: None.

F. (U) PROGRAM DOCUMENTATION:

SOR (No. 35-13)	SEP 76
OSU MDCP	MAY 87
OSIS DCP	JAN 90
OSU Acquisition Plan	JAN 90
OSU TEMP	MAR 90

G. (U) RELATED ACTIVITIES: None.

H. (U) OTHER APPROPRIATION FUNDS: (DOLLARS IN THOUSANDS)

PROGRAM	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL
(U) PROCUREMENT					
OPN BA2 #102	3,278	2,680	549	CONT.	CONT.
Correlation Upgrade					

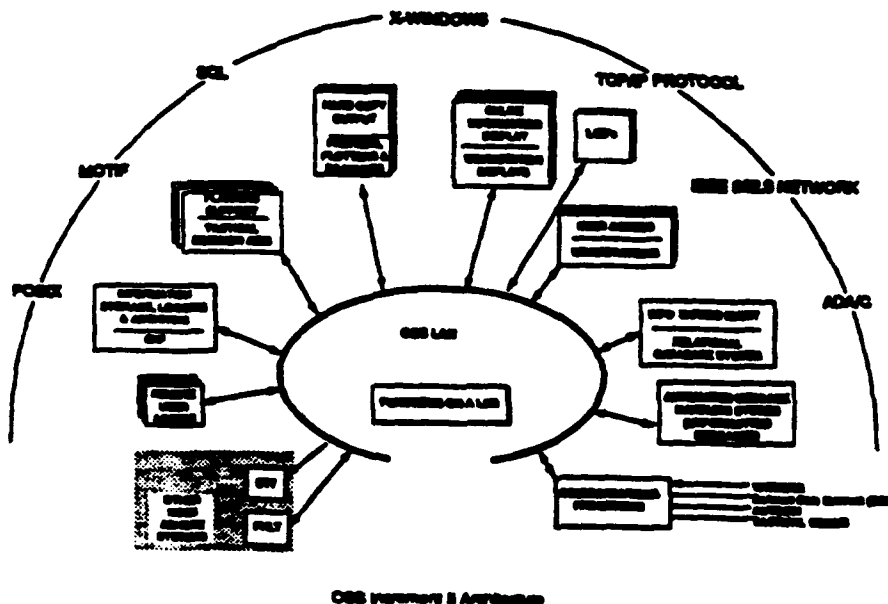
I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) TEST AND EVALUATION DATA: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Tactical Command Systems (TCS)
PROJECT NUMBER: X2041 PROJECT TITLE: Operations Support System (OSS)



POPULAR NAME: OPERATIONS SUPPORT SYSTEM (OSS)

A. (U) SCHEDULE/BUDGET INFORMATION: (DOLLARS IN THOUSANDS)

SCHEDULE	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program			NPDM	CONTINUING
Milestones			12/92	
Engineering		INCR II	INCR II	CONTINUING
Milestones		PDR/CDR	PDR/CDR	
		INCR I IOC		
T&E	DT-IIC IA &	DT II 1B &		CONTINUING
Milestones	2A	2B		
		OT IIA INCR I		
Contract		INCR II		
Milestones		CONTRACTS AWARD		
BUDGET	FY 1991	FY 1992	FY 1993	TO COMPLETE
(5000)				
Major	7,522	6,474	7,453	CONTINUING
Contracts				
Support	-0-	49	46	CONTINUING
Contracts				
In-House	4,366	1,485	1,247	CONTINUING
Support				
GFE	100	250	150	CONTINUING
Other				
Total	11,988	8,258	8,896	CONTINUING

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N

BUDGET ACTIVITY: 5

PROGRAM ELEMENT TITLE: Tactical Command Systems (TCS)

PROJECT NUMBER: X2041 PROJECT TITLE: Operations Support System (OSS)

B. (U) DESCRIPTION: The Chief of Naval Operations (CNO), Fleet Commanders in Chiefs (CINCs), and Unified Commanders (USCINCLANT and USCINCPAC) require a single, integrated command and control system at the Navy Command Center (NCC), Fleet Command Centers (FCC), and the Unified Command Centers, respectively, to receive, process, display and assess the readiness and disposition of own, neutral, and potentially hostile forces. The Operations Support System (OSS) establishes a baseline and incrementally upgrades the information management system to provide modernized Navy access to Worldwide Military Command and Control System (WWMCCS) and improved integrated command decision aids and displays. The OSS uses the Joint Logistics Commanders Guidance of March 1987 on Evolutionary Acquisition (EA) as the strategy for development. The EA concept includes a plan for incremental achievement of desired capability, early fielding of initial incremental operational capability and continual feedback from the users, by interfacing existing systems such as the Joint Operational Tactical System (JOTS), and the Fleet Command Center Battle Management Program (FCCBMP), Force Requirement Expert System (FRESH), Capabilities Assessment Expert System (CASES) and Operations Support Group Prototype (OSGP). Increment II will develop an integrated, logistically supportable, and cost effective single system, which includes OSIS Baseline Upgrade (OSU) interface, Navy WWMCCS Software Standardization (NWSS) replacement, current system functionality improvement, and latest state-of-the art Commercial Off The Shelf (COTS) technologies.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Completed design/integration and developmental test of Increment I component systems (JOTS, OSGP, and FRESH) and continued design and development of CASES.
- b. (U) Completed POA&M for transitioning NWSS to OSS.
- c. (U) Designed Consolidated History File (CHF).
- d. (U) Began design of Casualty Reporting (CASREP) message processing.
- e. (U) Completed draft of Interface Design Specification for remote users.
- f. (U) Completed & installed System Admin functions for message processing.
- g. (U) Completed draft of System Design Documentation for Increment II.
- h. (U) Completed software upgrades and installed JOTS II (ver 0.3.1.11) software.
- i. (U) Designed Prototype for integration of general Employment Scheduler including functionality from NWSS, PC Employment Scheduling (EMPSKD), Fleet Employment Scheduling System and FRESH.
- j. (U) Conducted Beta Test at CNO for Release 91-1.
- k. (U) Completed design, integration, and certification testing of OSS to NWSS interface via the Automatic Digital Network.
- l. (U) Completed prototype of Query Assist Language (QAL) and submitted to sites for evaluation and feedback.
- m. (U) Conducted Fleet Project Team meeting soliciting user feedback on OSS system performance and functionality.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N

BUDGET ACTIVITY: 5

PROGRAM ELEMENT TITLE: Tactical Command Systems (TCS)

PROJECT NUMBER: X2041 PROJECT TITLE: Operations Support System (OSS)

n. (U) Analyses requirements and specification for OSS interoperability with Modernized Navy Front End Processor (MNPEP).

2. (U) FY 1992 PROGRAM:

- a. (U) Continue Increment II Full Scale Engineering Development.
- b. (U) Continue integrated logistics support and configuration mgmt.
- c. (U) Design, develop, test and integrate software for workstation, database, communications, and decision aid functions.
- d. (U) Install initial communications server MNPEP and CLF/USCL, CPF/USCP, CNE, London and Naples and CNO.
- e. (U) Provide system engineering and technical support to users for prototype orientation and user feedback.
- f. (U) Test, integrate and implement Naval Warfare Tactical Data Base (NWTDB).
- g. (U) Complete required System documentation for FY92.
- h. (U) Begin required System documentation for FY93.
- i. (U) Design, develop, test and integrate remote user access, NWSS common routines such as Route Generation, Land Mass avoidance, and Unit transfer.
- j. (U) Conduct Development Test and Evaluation for Increment I.
- k. (U) Conduct Operational Test of Increment I.
- l. (U) Conduct Interoperability testing for Increment I.
- m. (U) Prepare for Increment II, Milestone III NPDM. (TEMP, AP, Integrated Program Summary)
- n. (U) Complete design and development of CASREP message processing.
- o. (U) Develop, test, integrate and implement tactical module (JOTS Unification) Ashore Command Center System (ACCS) Baseline under X Windows.

3. (U) FY 1993 PLANS:

- a. (U) Conduct NPDM for Increment II, Milestone III decision.
- b. (U) Implement CASREP, remote user access and NWSS common routines.
- c. (U) Complete system documentation for FY 93 (Software Design Document, Interface Design Spec, Test procedures, user manual, training manuals, system mgrs doc, data base admin doc).
- d. (U) Begin Milestone III phase for Increment II - continue sys eng efforts to perform system definition, design and implementation.
- e. (U) Conduct analysis on state-of-the art Multi level security COTS packages.
- f. (U) Begin System documentation for FY94 (Software Design Spec, Test procedures, users manuals, training manuals, system mgrs doc, data base admin doc).
- g. (U) Conduct Preliminary Design Review (PDR) on EMPSKD, Movement Report (MOVREP) positional processing, tactical module, and decision aid functions.
- h. (U) Conduct Fleet Project Team meeting.
- i. (U) Conduct Interoperability test with new release of tactical module (NCTS) for ACCS.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604231N BUDGET ACTIVITY: 5
 PROGRAM ELEMENT TITLE: Tactical Command Systems (TCS)
 PROJECT NUMBER: X2041 PROJECT TITLE: Operations Support System (OSS)

- j. (U) Integrate state of the art large screen displays, briefing tools, and data base machine.
- k. (U) Conduct developmental testing on Release 93-1.
- l. (U) Design, develop and integrate upgrades to tactical module (NCTS-A) for ACCS.
- m. (U) Design, develop and integrate decision aid functions (i.e. CASES).
- n. (U) Conduct Technical Working Group.
- o. (U) Design, develop, test, integrate EMPSKD, MOVREP, and Positional Processing.
- p. (U) Integrate TAC3 Workstation into OSS architecture.
- q. (U) Upgrade local area networks and all supporting equipment to next generation capability (i.e. TAC3 Workstation) as required.

- 4. (U) PROGRAM TO COMPLETION: This is a continuing program.
 - a. (U) Complete NWSS transition to OSS.
 - b. (U) Conduct OPEVAL.
 - c. (U) Integrate, Test and Implement multi level security COTS pkgs.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVOCEANSYSCEM, San Diego, CA
 CONTRACTORS: PLANNING RESEARCH CORPORATION, MCLEAN, VA

E. (U) COMPARISON WITH FY 1992/1993 PRESIDENT'S BUDGET:

- 1. (U) Technology Changes: None.
- 2. (U) Schedule Changes: None.
- 3. (U) Cost Changes: None.

F. (U) PROGRAM DOCUMENTATION:

OSS Operational Requirement 12/87 OSS Acquisition Plan 12/89
 OSS Computer Resources Life Cycle Management Plan (CRLCMP) 9/89
 OSS Decision Coordinating Paper 9/89
 OSS TEMP 10/89 OSS Operational Logistic Support Plan (OLSP) 10/89

G. (U) RELATED ACTIVITIES: PE 0303152N: WWMCCS ADP Modernization (WAM).
 OSS will supply data to the Joint Chiefs of Staff and will interface with the Joint Operations Planning and Execution System (JOPES) a subsystem of the WWMCCS System.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT					
OPN # 102	3652	5021	4963	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) TEST AND EVALUATION DATA: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604233N
PROGRAM ELEMENT TITLE: ATA/AX

BUDGET ACTIVITY: 4

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
D2027	A-12 Development	17,240	0	0	0	1,989,799*
D2028	A-12 P3I	1,550	0	0	0	24,001
D2129	AX Development	137,544	0	165,583	Cont.	Cont.
	TOTAL	156,334	0	165,583	Cont.	Cont.

* Excludes program funding budgeted in other Program Elements

B. (U) DESCRIPTION: This program develops the Navy's next carrier-based tactical aircraft to fulfill the all weather medium attack mission as a replacement for the A-6 INTRUDER. The A-12 FSED contract was terminated for default on 7 January 1991. In terminating the A-12, SECDEF acknowledged the requirement for a replacement for the aging A-6 aircraft. Accordingly this program will develop a follow-on medium attack aircraft replacement known as AX. The AX program will be inter-service avionics commonality in accordance with Congressional direction.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604233N
PROGRAM ELEMENT TITLE: ATA/AX
PROJECT NUMBER: D2129

BUDGET ACTIVITY: 4
PROJECT TITLE: AX Development

PICTURE: Not Available.

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

<u>SCHEDULE</u>	<u>FY 1991*</u>	<u>FY 1992</u>	<u>FY 1993</u>	<u>TO COMPLETE</u>
Program	MS O	DAB Prog.	MS I	MS II est.
Milestones	6/91	Rev. 9/92	5/93	FY 1997
Engineering				
Milestones				
T & E				
Milestones				
Contract		CEED	DEV	
Milestones		12/91	5/93	Continuing
BUDGET (\$K)	FY 1991	FY 1992	FY 1993	Program Total To Complete
Major				
Contract	104.996		129.450	Continuing
Support				
Contract				Continuing
In-House				
Support	24.669		36.133	Continuing
GFE/				
Other	7.879			
Total	137.544	0	165.583	Continuing

- * FY 1991 reflects funds reprogrammed from A-12 to AX. These funds cover all AX efforts in FY 1991 and FY 1992.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604233N
PROGRAM ELEMENT TITLE: ATA/AX
PROJECT NUMBER: D2129

BUDGET ACTIVITY: 4
PROJECT TITLE: AX Development

B. (U) DESCRIPTION: This program develops a survivable, multi-mission tactical aircraft to fulfill the Navy's all weather medium attack mission as a replacement for the A-6 INTRUDER. The AX aircraft will make maximum possible use of common avionics specifications addressed by Joint Integrated Avionics Working Group (JIAWG).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Program:
 - a. (U) Initiated AX program planning.
(The following will be executed with FY 1991 funds in FY 1992):
 - b. (U) Awarded 5 Concept Exploration and Definition (CE&D) contracts for approximately \$20 million each in December 1991.
 - c. (U) Finalize MOU with Air Force for Air Force participation in AX Program.
 - d. (U) Conduct Cost and Operational Effectiveness Analysis (COEA) for AX.
 - e. (U) Prepare Demonstration and Validation (D&V) solicitation.
 - f. (U) Prepare for and participate in a Defense Acquisition Board Program Review.
 - g. (U) Prepare common USN/USAF Operational Requirement Document.
 - h. (U) Conduct government evaluation of CE&D trade studies.
 - i. (U) Participate in JIAWG efforts.
2. (U) FY 1993 Program:
 - a. (U) Complete CE&D efforts.
 - b. (U) Solicit, award, and manage D&V contract(s).
 - Conduct risk reduction activities
 - Conduct initial Systems Requirement Review
 - c. (U) Prepare for and participate in a Defense Acquisition Board Milestone I review.
 - d. (U) Establish a Joint Program with the USAF pending direction at Milestone I.
 - e. (U) Complete COEA which supports Milestone I.
 - f. (U) Participate in JIAWG development.

3. (U) Program to Completion plans: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE (top five): NATC, Patuxent River, MD; NWC, China Lake, CA; NADC, Warminster, PA; PSDJAX, Jacksonville, FL; AEDC, Tullahoma, TN. **CONTRACTOR:** Rockwell International Corp, Los Angeles, CA; McDonnell Douglas Corp, St. Louis, MO; Lockheed Corp, Marietta, GA; Grumman Aerospace Corp, Bethpage, NY; and General Dynamics, Ft. Worth, TX.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not Applicable.
2. (U) Schedule Changes: Reflects a 5 month schedule adjustment and increased avionics risk reduction in the D&V phase. The schedule adjustment is the result of a DAB change to the acquisition strategy to allow a review prior to release of the D&V RFP.
3. (U) Cost Changes: FY 1993 reflects transfer of funds from Projects D2027 and D2028 and decrease of \$185,657K resulting from a clearer definition of AX schedule requirements.

F. (U) PROGRAM DOCUMENTATION: TOR 6/91, MNS 6/91, ADM 7/91.

G. (U) RELATED ACTIVITIES: P.E. 0604239F, Advanced Tactical Fighter; P.E. 0604223A, Light Armed Scout Helicopter; P.E. 0604242F.

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 06J4233N
PROGRAM ELEMENT TITLE: ATA/AX
PROJECT NUMBER: D2129

BUDGET ACTIVITY: 4

PROJECT TITLE: AX Development

- I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.**
- J. (U) TEST AND EVALUATION: Test and Evaluation Master Plan not established until MS I.**

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604255N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: ELECTRONIC WARFARE SIMULATOR DEVELOPMENT

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER PROGRAM	TITLE	FY1991 ACTUAL	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL
W0602	ECHO	19,594	14,011	19,691	CONT	CONT
W0672	ENEWS	9,525	6,730	10,917	CONT	CONT
	TOTAL	29,119	20,741	30,608	CONT	CONT

B. (U) DESCRIPTION: This program consolidates the design, fabrication and integration of naval threat radar simulators for increased managerial emphasis and coordination. These simulator development efforts provide realistic Developmental and Operational Test and Evaluation (DT/OT) of Tri-Services Electronic Warfare (EW) systems and defensive tactics against former Soviet and Free-World Anti-Air and Anti-Ship weapon systems in accordance with services requirements, and General Accounting Office and Congressional recommendations.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604255N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: ELECTRONIC WARFARE SIMULATOR DEVELOPMENT
PROJECT NUMBER: W0602 PROJECT TITLE: EW ENVIRONMENT SIMULATION

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0602	ECHO	19,594	14,011	19,691	CONT	CONT

B. (U) DESCRIPTION: The objective of this project is the development of the necessary simulation facilities and approaches to allow the determination of the effectiveness of EW in real world engagement situations and to support the introduction of modern, effective systems into Naval Aviation. The heavy use of the test resources by all services demonstrates the importance of these assets. The Navy has been very successful in executing all of its major programs, all to date have had no major technical problems.

(U) The Electronic Warfare Simulator Development project is unique in that it is the only program within the Department of Defense dedicated solely to developing and providing test assets to test and evaluate against Naval threats and is a critical part of the OSD Test and Evaluation Master Plan (TEMP). The OSD master plan employs many of the Electronic Warfare Simulator Development project resources for planning, analysis, testing and verification of airborne EW equipment.

(U) This project directly supports the test and evaluation requirements of HARM, ALR-67/Advanced Special Receiver (ASR), ALQ-165, EA-6B ADVCAP, Integrated Defensive Avionics Program (IDAP), Advanced Airborne Expendable Decoy (AAED), expendable jammers and decoys as well as other EW systems in the Navy and other services which will IOC in the 1990s.

(U) This project provides for the development of an Integrated Air Defense T&E complex for flight test and laboratory evaluation of airborne EW equipments and tactics development at the Naval Weapons Center (NWC), China Lake, Ca, the Pacific Missile Test Center (PHTC), Pt Mugu, Ca, and the Naval Air Test Center (NATC), Patuxent River, Md.

(U) To avoid duplication, both within the Navy and other services, T&E resource requirements are coordinated through the Navy Tri-Center (NWC, PHTC, NATC) simulator development concept for mutual support, cost reductions and increased test effectiveness and the OSD CROSSBOW-8 committee.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604255N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: ELECTRONIC WARFARE SIMULATOR DEVELOPMENT
PROJECT NUMBER: W0602 PROJECT TITLE: EW ENVIRONMENT SIMULATION

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:

- a. (u) Continued antenna modifications to Simulator
(ECHO RANGE I-15, Crossbow Generic Radar (CGR)).
- b. (U) Continued development of Generic Acquisition Radar (GAR)
simulation.
- c. (U) Continued EW/acquisition radar laboratory simulation
development at PMTC.
- d. (U) Continued EW simulation systems engineering
investigations.
- e. (U) Completed Background Environment Generator at NATC.
- f. (U) Completed Emitter Simulator control system development.
- g. (U) Continued C² Environment development at NATC.
- h. (U) Continued OSD directed emitter validation/verification
program.

2. (U) FY 1992 Program:

- a. (U) Continue antenna modifications to Simulator
(ECHO RANGE I-15, (CGR)).
- b. (U) Continue development of GAR simulation.
- c. (U) Continue EW/acquisition radar laboratory simulation
development at PMTC.
- d. (U) Continue EW simulation systems engineering investigations.
- e. (U) Terminate C² Environment development at NATC.
- f. (U) Continue OSD directed emitter validation/verification
program.

3. (u) FY 1993 Plans:

- a. (u) Continue antenna modifications to Simulator
(ECHO RANGE I-15, (CGR)).
- b. (U) Continue development of GAR simulation.
- c. (U) Continue OSD directed emitter validation/verification.
- d. (U) Commence the development of an expanded threat environment
simulator at PMTC.
- e. (u) Commence development of The receiver
processor section of the (NWC, PMTC, NATC)
- f. (U) Continue EW simulator systems engineering investigations.

4. (U) Program to completion: This is a continuing program.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604255N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: ELECTRONIC WARFARE SIMULATOR DEVELOPMENT
PROJECT NUMBER: W0602 PROJECT TITLE: EW ENVIRONMENT SIMULATION

D. (U) WORK PERFORMED BY: ECHO range at NWC, China Lake, CA and the Electronic Simulation and Evaluation Laboratory (ECSEL) at PMTC, Oxnard, CA and NATC at Patuxent River, MD.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not Applicable.
2. (u) SCHEDULE CHANGES:
 - a. (u) The transmitter has been delayed due to prior year funding reductions.
 - b. (u) The simulator schedule will be extended an additional year.
 - c. (U) Continuous OSD directed emitter validation/verification efforts will be reduced.
 - d. (u) Commence development of transmitter was delayed.
3. (U) COST CHANGES: Funding was reduced by \$2,599K in FY 1993 to reflect the impact of the schedule changes.

F. (U) PROGRAM DOCUMENTATION: NAFDD 052-098

G. (U) RELATED ACTIVITIES: Navy efforts under this project are coordinated with other Service requirements through the OSD Joint Executive Committee on Air Defense Threat Simulations (EXCOM), the OSD CROSSBOW-S Committee and the Joint Coordinating Committee on Electronic Defense Systems.

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (u) MILESTONE SCHEDULE:

T&E Simulator	IOC
a.	
b.	
c. (U) Receiver/Processor	
c. (U) EW/acquisition radar simulator (GAR)	4Q/93
d.	
e. (U) Expanded Threat Simulation	4Q/95

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604255N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: ELECTRONIC WARFARE SIMULATOR DEVELOPMENT
PROJECT NUMBER: W0672
PROJECT TITLE: EFFECTIVENESS OF NAVY ELECTRONIC WARFARE SYSTEMS (ENEWS)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER PROGRAM	TITLE	FY1991 ACTUAL	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL
W0672	ENEWS	9,525	6,730	10,917	CONT	CONT

B. (U) DESCRIPTION: The ENEWS program is unique in that it is the only program within the Department of Defense solely dedicated to developing and providing assets used to test and evaluate the effectiveness of shipboard EW systems and tactics against Anti-Ship Missile (ASM) systems, the primary threat to surface ships.

(U) The ENEWS program is a critical part of the OSD Test and Evaluation Master Plan (TEMP). The OSD master plan employs many of the ENEWS resources for planning, analysis, testing and verification of ship based EW/Decoy systems. ENEWS is projected to provide T&E support for Combat Systems At Sea Qualification Testing (CSSQT) for CG-66, 67, 68, DDG-52, CV ships, and Developmental and Operational Test and Evaluation (DT/OT) of the SLQ-32 V3 Upgrade, SLQ-32 PHASE improvements, SLQ-32 ADCAP upgrade, SLQ-32 V4, SIDEKICK, AN/ALQ-149 testing, RAIDS support, OUTLAW Bandit Systems, and numerous other projects.

(U) The objective of the program is the development of the necessary simulation facilities and approaches to allow determination of the effectiveness of EW in real world engagement situations and to support the introduction of modern, effective systems into the surface and subsurface Navy. The heavy use of the ENEWS resources by NAVSEA and other system developers speaks to the overall importance of these assets. The program has supported system design, DT/OT, tactics development, and has had great impact in responding to crisis situations, i.e. tactics development in support of IRAN/HARPOON THREAT, FALKLANDS CONFLICT, PERSIAN GULF CRISIS, OPERATION DESERT SHIELD/STORM Operations.

(U) A combination of computer simulation and modeling, Hardware-In-the-Loop (HIL) test facilities and ASM simulators flown on an EP-3 aircraft serve as the major program assets. These resources are used in combination to T&E the effectiveness of EW systems in a cost effective manner.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604255N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: ELECTRONIC WARFARE SIMULATOR DEVELOPMENT
PROJECT NUMBER: W0672 PROJECT TITLE: ENEWS

C. u) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (u) FY 1991 ACCOMPLISHMENTS:

- a. (U) Continued upgrade of ENEWS reference library.
- b. (U) Continued digital modeling/scenario development.
- c. (u) Continued initial AN/ALQ-170 simulator development.
- d. (u) Continued dual band simulator development.
- e. (u) Continued simulator.
- f. (u) Continued simulator development.
- g. (u) Continued simulator development.
- h. (u) Continued simulator development.
- i. (u) Initiated controller upgrade.
- j. (u) Initiated
- k. (u) Initiated
- l. (u) Initiated development.
- m. (U) Initiated systems readiness for T&E.

2. (U) FY 1992 PROGRAM:

- a. (U) Continue systems readiness for T&E.
- b. (U) Continue upgrade of ENEWS reference library.
- c. (U) Continue digital modeling/scenario development.
- d. (u) Continue controller upgrade.
- e. (u) Continue
- f. (u) Continue

3. (U) FY 1993 PLANS:

- a. (U) Continue systems readiness for T&E.
- b. (U) Continue upgrade of ENEWS reference library.
- c. (U) Continue digital modeling/scenario development.
- d. (u) Reinitiate dual band simulator development.
- e. (u) Reinitiate simulator.
- f. (u) Continue Controller upgrade.
- g. (u) Reinitiate AN/ALQ-170
- h. (u) Reinitiate AN/ALQ-170
- i. (u) Complete
- j. (u) Complete

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604255N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: ELECTRONIC WARFARE SIMULATOR DEVELOPMENT
PROJECT NUMBER: W0672 PROJECT TITLE: ENEWS

- l. (u) Complete simulators.
- m. (u) Initiate
- n. (u) Initiate instrumentation of
- o. (u) Initiate
- p. (u) Initiate simulator upgrade.
- q. (u) Initiate band simulator development.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: Naval Research Laboratory, Washington, D.C.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

- 1. (U) Technology changes: Not Applicable.
- 2. (U) Schedule changes: Not Applicable.
- 3. (U) Cost changes: Not Applicable.

F. (U) PROGRAM DOCUMENTATION: NAPDD 049-09 - Jan 88.

G. (U) RELATED ACTIVITIES: Not Applicable.

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (u) MILESTONE SCHEDULE: IOC

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0604258N

Budget Activity: 6

Program Element Title: TARGET SYSTEMS DEVELOPMENT

A. (U) RESOURCES: (Dollars in Thousands)

Project Number Title	FY 1991 Actual	FY 1992 Estimate	FY 1993 Estimate	TO COMPLETE	TOTAL PROGRAM
A0609 Aerial Target Systems Dev.	7,565	10,738	16,728	Cont.	Cont.
A0610 Weapons Sys T&E Targets	4,652	12,247	14,693	Cont.	Cont.
A0611 Supersonic Low Altitude Target	36,192	2,600	6,778*	6,745*	270,993
S0612 Surface Targets Development	1,069	1,563	1,837	Cont.	Cont.
TOTAL	49,478	27,148	40,036	Cont.	Cont.

* (U) Funds in FY 1993 and to complete will be used to initiate concept exploration and definition for AQM-127 alternative. Total SLAT program excludes this effort.

B. (U) DESCRIPTION: This program element funds the development and procurement of Aerial and Surface Targets and associated target augmentation and auxiliary systems (TA/AS) necessary to duplicate or simulate threat characteristics in support of weapons systems performance test and evaluation and Fleet training. Included within this Program Element are QF-4S development, BQM-74 upgrade, and various TA/AS development (A0609); procurement of QF-4N, and TA/AS for Navy weapons systems test and evaluation (A0610); development of the AQM-127 SLAT (A0611); and continued development of surface towed targets, improved target control system and an anti-radiation missile target (S0612).

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0604258N Budget Activity: 6
 Program Element Title: TARGET SYSTEMS DEVELOPMENT
 Project Number: A0609 Project Title: AERIAL TARGET SYSTEMS DEV.

A. (U) RESOURCES: (Dollars in Thousands)

Project Number	Title	FY 1991 Actual	FY 1992 Estimate	FY 1993 Estimate	To Complete	Total Program
A0609	Aerial Target Systems Dev.	7,565	10,738	16,728	Cont.	Cont.

B. (U) DESCRIPTION: Aerial Target Systems and associated target augmentation and auxiliary systems are developed in response to the need to test and provide training for anti-air-warfare (AAW) and anti-surface warfare (ASUW) systems required to defend fleet surface and air units in a hostile environment. The threat envelope covered extends from the surface to 100K feet for speeds in the low subsonic range to MACH 4.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Continued Engineering Manufacturing Development (EMD) on QF-4S.
- b. (U) Completed preliminary design trade off study on advanced command/control transponder.
- c. (U) Continued development of ULQ-21 Electronic Counter Measures (ECM) modules/ECM decoys.
- d. (U) Completed BQM-74C upgrade to BQM-74E Basic Fleet Target (BFT).
- e. (U) Continued target augmentation system (TAS) Kits RMX-34 integration (previously termed A-6/TONS).
- f. (U) Conducted preliminary design trade off study on a Vector Scorer.
- g. (U) Continued BQM-74C upgrade to BQM-74E Mobile Sea Range (MSR).

2. (U) FY 1992 PROGRAMS:

- a. (U) Complete TAS kit RMX-34 integration.
- b. (U) Suspend Navy QF-4S EMD program. Initiate joint QF-4 program per direction of OSD JCG(T&E) under Project Reliance.
- c. (U) Continue development of ULQ-21/decoy ECM module.
- d. (U) Initiate development of non-cooperative aerial vector scorer (NAVS).
- e. (U) Complete BQM-74C upgrade to BQM-74E (MSR).

3. (U) FY 1993 PLANS:

- a. (U) Initiate development of AGM-37C booster.
- b. (U) Initiate development of AGM-37 integration with an alternate supersonic launch platform.
- c. (U) Continue joint QF-4 EMD.
- d. (U) Continue NAVS development.
- e. (U) Continue development of ULQ-21/decoy ECM modules.
- f. (U) Initiate development of BQM-74 product improvement (PI).

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVWPNCEN, China Lake, CA; NAVAIRDEVCEM, Warminster, PA; PACMISTESTCEN, Point Mugu, CA; NAVAVNDEPOT, Cherry Point, NC and NAVAVNDEPOT, North Island, CA; NAVAIRENGCEN, Lakehurst, NJ; NOS IH, Indian Head, MD. CONTRACTORS: Beech Aircraft, Wichita, KS; Northrop, Ventura, CA; Motorola, Scottsdale, AZ; Southwest Aerospace, Santa Ana, CA; Marquardt, Van Nuys, CA.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0604258N Budget Activity: 6
 Program Element Title: TARGET SYSTEMS DEVELOPMENT
 Project Number: A0609 Project Title: AERIAL TARGET SYSTEMS DEV.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U)Technology Changes: Not Applicable.
2. (U)Schedule Changes: Not Applicable.
3. (U)Cost Changes: Not Applicable.

F. (U) PROGRAM DOCUMENTATION:

QF-4S TOR 6/85
 OR 12/86

G. (U) RELATED ACTIVITIES:

o Test and evaluation of current in-service weapons systems: Program Element 0603715D/AIM-9M; Program Element 0603318N/Advanced Surface-Air Missile (AEGIS); Program Element 0604372N/New Threat Upgrade (Tartar/Terrier); Program Element 0604366N/Standard Missile Improvements (Standard Missile 1 and 2); and Program Element 0604358N/CIWS (PHALANX).

o Systems currently in test and evaluation: Program Element 0604367N/Tomahawk; Program Element 0604314N/AMRAAM; Program Element 0604366N/Standard Missile Improvements (Standard Missile II block upgraded); Program Element 0604369N/5in Rolling Airframe Missile; and Program Element 0604361N/NATO SEASPARROW.

o Weapons systems to enter test and evaluation: 5" guided projectile, high energy laser, DDG-51.

o Fleet weapons training with air-to-air, surface-to-air, air-to-surface and surface-to-surface weapons.

There is no duplication of effort between this project and others within the Navy or DOD.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 Actual	FY 1992 Estimate	FY 1993 Estimate	To Complete	Total Program
APFN/P-1					
WPN # 15	132,410	173,342	170,199	Cont	Cont

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable

J. (U) MILESTONE SCHEDULE:

	I	II	III	IOC
BQM-74 E (BFT)	N/A	FY88/2Q	FY91/3Q	FY93/3Q
BQM-74E (MSR)	N/A	FY88/2Q	FY92/3Q	FY94/3Q
QF-4S	N/A	FY92/3Q	FY96/1Q	FY96/2Q
F-14/AQM-37 INTEG	N/A	FY93/4Q	FY96/3Q	FY97/3Q
AQM-37 BOOSTER	N/A	FY93/4Q	FY96/4Q	FY97/3Q
BQM-PI	N/A	FY92/3Q	FY97/2Q	FY98/2Q
NAV SCORER	N/A	FY92/3Q	FY95/2Q	FY97/2Q
TA/AS RMC-34	N/A	FY83/2Q	FY90/1Q	FY93/4Q

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0604258N **Budget Activity:** 6
Program Element Title: TARGET SYSTEMS DEVELOPMENT
Project Number: A0610 **Project Title:** WEAPONS SYSTEM T&E TARGETS

A. (U) RESOURCES: (Dollars in Thousands)

Project Number	Title	FY 1991 Actual	FY 1992 Estimate	FY 1993 Estimate	To Complete Cont.	Total Program Cont.
A0610	Weapons Sys T&E Targets	4,652	12,247	14,693		

B. (U) DESCRIPTION: This project provides for test and evaluation of Naval Weapons Systems which closely replicate current and projected threats to fleet units in the AAW and ASW environments. This replication must include characteristics related to size, performance envelope, and electromagnetic and infrared signatures. As threats change, changes must be made to keep the targets as threat representative as possible. This is done in response to changes in the requirements of the developers of naval weapons systems.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) **FY 1991 ACCOMPLISHMENTS:**
 - a. (U) Completed procurement (second increment) of 8 firing-error indicators (FEI) scorers.
 - b. (U) Procured 75 DSQ-37 scorers.
2. (U) **FY 1992 PROGRAM:**
 - a. (U) Convert 5 F-4N aircraft into QF-4N targets.
 - b. (U) Procure 10 Advanced Radar Missile Scorers (ARMS) and 1 ground station.
3. (U) **FY 1993 PLANS:**
 - a. (U) Convert 6 F-4N aircraft into QF-4N targets.
 - b. (U) Procure 6 firing error indicator (FEI) scorers.
 - c. (U) Procure 10 ARMS.
4. (U) **PROGRAM TO COMPLETION:** This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: PACMISTESTCEN, Point Mugu, CA; NAVAIRDEVCEEN, Warminster, PA; NAVMPNCEN, China Lake, CA; NAVAVNDEPOT, Cherry Point, NC and NAVAVNDEPOT North Island, San Diego, CA; NAVAIRENGCEN, Lakehurst, NJ. **CONTRACTORS:** Allied Bendix, Mishawaka, IN; Teledyne Ryan Aeronautical, San Diego, CA; Southwest Aerospace, Santa Ana, CA.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENTS BUDGET:

1. (U) **Technology Changes:** Not Applicable.
2. (U) **Schedule Changes:** Not Applicable.
3. (U) **Cost Changes:** Not Applicable.

F. (U) PROGRAM DOCUMENTATION:

QF-4N TEMP (#1172) 9/85
 QF-4S TEMP (#1172-01) 3/89

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0604258N Budget Activity: 6
Program Element Title: TARGET SYSTEMS DEVELOPMENT
Project Number: A0610 Project Title: WEAPONS SYSTEM T&E TARGETS

G. (U) RELATED ACTIVITIES:

o Test and evaluation of current in-service weapons systems: Program Element 0603715D/AIM-9M; Program Element 0603318N/Advanced Surface-Air Missile (AEGIS); Program Element 0604372N/New Threat Upgrade (Tartar/Terrier); Program Element 0604366N/Standard Missile Improvements (Standard Missile 1 and 2); and Program Element 0604358N/CIWS (PHALANX).

o Systems currently in test and evaluation: Program Element 0604367N/Tomahawk; Program Element 0604314N/AMRAAM; Program Element 0604366N/Standard Missile Improvements (Standard Missile II block upgraded); Program Element 0604369N/5in Rolling Airframe Missile; and Program Element 0604361N/NATO SEASPARROW.

o Weapons systems to enter test and evaluation: 5" guided projectile, high energy laser.

There is no duplication of effort between this project and others within the Navy or DOD.

H. (U) OTHER APPROPRIATION FUNDS: This is not an acquisition program.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable

J. (U) MILESTONE SCHEDULE: Not Applicable

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0604258N

Budget Activity: 6

Program Element Title: TARGET SYSTEMS DEVELOPMENT

Project Number: A0611

Project Title: SUPERSONIC LOW ALTITUDE TARGET

C. (U) DESCRIPTION: This project provides for the development and procurement of a low altitude supersonic target which simulates the anti-ship cruise missile threat. The AQM-127A target weighs 2,500 pounds and is capable of flying at a minimum altitude of less than 30 feet at 2.5 MACH. It is air launched at subsonic speeds and has a 55 nautical mile range until fuel burnout. The follow-on development program requirements are similar except that speed is reduced to 2.1 Mach and development will focus on design to cost. Development of the SLAT program was terminated in FY 1992. FY 1993 funds provide for concept explanation and definition for alternatives to SLAT.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Commenced Contractor Test and Evaluation/Navy Test and Evaluation (CTE/NTE) for the AQM-127. Conducted CTE flights in November 1990 and May 1991, both flights unsuccessful.

2. (U) FY 1992 PROGRAMS:

a. (U) Continue CTE flight test and close out of AQM-127 contract.

3. (U) FY 1993 PLANS:

a. (U) Commence concept exploration and definition for AQM-127 (SLAT) alternatives.

4. (U) Program to completion: Continue the concept exploration and definition for AQM-127 (SLAT) alternatives.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVWPNCEN, China Lake, CA; NAVAIRDEVCEM, Warminster, PA; PACMISTESTCEN, Point Mugu, CA; NOS IH, Indian Head, MD; NSWC, Dahlgren, VA; NAVAIRTESTCEN, Patuxent, MD; NAVAIRENGCEN, Lakehurst, NJ. CONTRACTOR: Martin Marietta, Orlando, FL.

F. (U) RELATED ACTIVITIES:

o Systems currently in test and evaluation: Program Element 0603318N/Advanced Surface-Air Missile (AEGIS); Program Element 0604366N/Standard Missile Improvements; and Program Element 0604372N/New Threat Upgrade.

o Proposed systems: Arleigh Burke (DDG-51), Standard Missile II Block Upgrades.

There is no duplication of effort between this project and others within the Navy or DOD.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0604258N

Budget Activity: 6

Program Element Title: TARGET SYSTEMS DEVELOPMENT

Project Number: 80612

Project Title: SURFACE TARGETS DEVELOPMENT

C. (U) DESCRIPTION: This project develops required seaborne target systems and their related target augmentation systems in support of air-to-air-surface and surface-to-surface weapons test and evaluation and fleet training.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:

a. (U) Completed Seaborne Powered Target (SEPTAR) Improved Control System.

b. (U) Continued Command and Control Augmentation Development.

c. (U) Continued Ship Simulator Platform. (obtain test bed)

d. (U) Commenced Weapons Systems/Emitter Interface.

e. (U) Continued Anti-Radiation Missile Emitter (ARME).

f. (U) Continued Surface Target Radar Simulator (STRS).

2. (U) FY 1992 PROGRAM:

a. (U) Continue Command and Control Augmentation development.

b. (U) Continue Ship Simulator Platform. (test bed alternatives)

c. (U) Continue Weapons Systems Emitter Interface.

d. (U) Complete ARME.

e. (U) Continue STRS.

3. (U) FY 1993 PLANS:

a. (U) Continue Command and Control Augmentation development.

b. (U) Continue Ship Simulator Platform (configuration selection).

c. (U) Continue Weapons System/Emitter Interface.

d. (U) Continue STRS.

e. (U) Commence Multi-Spectrum Augmentation.

4. (U) PROGRAM TO COMPLETION: This is a continuing effort.

E. (U) WORK PERFORMED BY: IN-HOUSE: PACMISTESTCEN, Pt. Mugu, CA.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN/line 192	4,906	5,272	8,375	Cont.	Cont.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604260N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: CH/MH-53E
PROJECT NUMBER: H1109 PROJECT TITLE: CH/MH-53E

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE Cont.	TOTAL PROGRAM Cont.
H1109	CH/MH-53E	17,690	9,167	12,456		

B. (U) DESCRIPTION: This project provides for the development of an improved main gearbox (MGB) for the H-53E. Improvements to the main gearbox include enhanced reliability and maintainability (increase time between scheduled removal from 1,250 hours to 2,050 hours). This project also provides for the development required to integrate a Global Positioning System (GPS) into the MH-53E. The integration of the GPS into the MH-53E will give the aircraft the capability to navigate in the national airspace and to conduct precise navigation using GPS while engaged in Airborne Mine Countermeasures (AMCM) operations. Additionally, this project provides funding for the development of a Composite Main Rotor Blade (CMRB) starting in FY 1993.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:

a. (U) GPS: Performed engineering analysis and design for prototype development.

b. (U) MGB: Performed engineering analysis/design. Began procurement of castings/forgings, and tool design and fabrication. Started components test. Preliminary design review conducted Dec 90.

2. (U) FY 1992 Program:

a. (U) GPS: Preliminary design review held Oct 91. Deliver aircraft for prototype installation Mar 92 and begin prototype installation. Critical design review scheduled May 92.

b. (U) MGB: Complete engineering analysis/design, procurement of castings/forgings, and tool design and fabrication. Manufacture required parts. Conduct components test. Critical design review scheduled Feb 92.

3. (U) FY 1993 Plans:

a. (U) GPS: Complete prototype installation. Commence technical testing (DT-IIIC) Sep 93.

b. (U) MGB: Perform preliminary military qualification test (PMQT), military qualification test (MQT) 1, MQT flight test, and MQT 2. Test at increased power. Prepare engineering test report.

c. (U) CMRB: Award CMRB development contract.

4. (U) Program to Completion: This is a continuing program.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604260N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: CH/MH-53E
PROJECT NUMBER: H1109 PROJECT TITLE: CH/MH-53E

D. (U) WORK PERFORMED BY: IN-HOUSE: NAC, Indianapolis, IN; NATC, Patuxent River, MD; NADC, Warminster, PA; NAPC, Trenton, NJ. CONTRACTOR: United Technologies Corporation, Sikorsky Aircraft Division, Stratford, CT; KER Systems, Vienna, VA; Horizons Technology, San Diego, CA

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: None

2. (U) SCHEDULE CHANGES: Delays in the GPS integration program caused by descoping of the system software requirements to meet budget constraints necessitated the rescheduling of DT-IIIC from FY 1992 to FY 1993. This in turn pushed OT-IIIC from FY 1993 to FY 1994.

3. (U) COST CHANGES: None

F. (U) PROGRAM DOCUMENTATION:

1. (U) GPS:

a. (U) DCP No. 133 Rev B 5/79; TEMP (Rev. 2) 12/89

b. (U) Additional documentation not required. Program approved under extension of application for GPS installations.

2. (U) MGB: NPDN 11/86. Program documentation not required for non-ACAT program.

G. (U) RELATED ACTIVITIES: Program Element 0604777N NAVSTAR GPS

H. (U) OTHER APPROPRIATION FUNDS: Funds budgeted in the applicable Aircraft Procurement line items.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None

J. (U) MILESTONE SCHEDULE:

1. (U) GPS: DT-IIIC 9/93; OT-IIIC 5/94

2. (U) MGB: CDR 2/92; PMQT 11/92; MQT 1 12/92; MQT 2 7/93

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604261N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Acoustic Search Sensors

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
H0478	ERAPS	6,779	5,195	846	110	31,618
H0480	ASW Sensors and Processing	2,791	13,051	33,556	CONT.	CONT.
H2000	Air Deployable Active Receiver	10,284	8,390	13,128	26,403	58,205
H2001	Tactical Surveillance Sonobuoy	14,940	-0-	-0-	-0-	69,081
	TOTAL	34,794	26,636	47,530	CONT.	CONT.

B. (U) DESCRIPTION: This program consists of four (4) projects:

(C) H0478 - The Expendable Reliable Acoustic Path Sonobuoy (ERAPS), AN/SSQ-75 Sonobuoy, is an active localization sensor for use by Anti-Submarine Warfare (ASW) aircraft. It is designed to use the Reliable Acoustic Path (RAP) propagation mode to provide air ASW forces the option to conduct active (small area) search and rapid localization of submarines. Detection ranges will be significantly greater than those experienced with today's active sonobuoys. The sonobuoy is deployed at selectable depths from ,

(U) H0480 - This project provides improved air ASW mission effectiveness through engineering development of hardware and software associated with acoustic systems, sensors, processing, post-processing, data recording, and displays for air ASW platforms. Key objectives: improved detection, classification, localization and tracking; and increased capacity and flexibility to handle multi-sensor data. Programs being funded during the period identified are the Acoustic Intercept System (AIS) which is a and the Generic Acoustic Stimulator System (GASS) which is a ocean, sensor and target modeling combination that will couple with all ASW trainers.

(U) H2000 - The Air Deployed Active Receiver (ADAR) sonobuoy is an expendable air launched acoustic receiver utilized by ASW aircraft to receive pulses from air deployed sources. The ADAR system will provide long range bistatic/multistatic detection and localization of quiet, slow-moving submarines in deep and shallow water. The sonobuoy will also be capable of functioning in a passive mode to track high speed targets. Intended mission areas include contact redetection, barrier protection, screening operations, and area search and surveillance.

(U) H2001 - The Tactical Surveillance Sonobuoy (TSS), AN/SSQ-102, was designed for large area search against potential submarine threats. System consisted of an expendable A-sized sonobuoy with trigger-controlled data storage capability, a 5-day in-water life, and associated avionics software modifications, creating a "force multiplier effect". This program was terminated in FY91.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604261N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Acoustic Search Sensors
PROJECT NUMBER: H0478 **PROJECT TITLE:** ERAPS

C. (U) DESCRIPTION: The Expendable Reliable Acoustic Path Sonobuoy (ERAPS), AN/SSQ-75, is an active localization sensor for use by ASW warfare aircraft. It is designed to use the RAP propagation mode to provide air ASW warfare forces the option to conduct active (small area) search and rapid localization of submarines.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:
a. (U) Completed contractor evaluation tests.
b. (U) Initiated contractor demonstration tests.
c. (U) Validated Development Test/Operational Test (DT/OT-IIA) software.

2. (U) FY 1992 PROGRAM:
a. (U) Complete Critical Design Review.
b. (U) Complete contractor demonstration tests.
c. (U) Validate ERAPS specification compliance.
d. (U) Complete DT-IIA.

3. (U) FY 1993 PLANS:
a. (U) Complete OT-IIA.
b. (U) Initiate low rate initial production.

4. (U) PROGRAM TO COMPLETION:
a. (U) Complete TECHVAL and OPEVAL.
b. (U) Initiate full rate production.

E. (U) WORK PERFORMED BY: IN-HOUSE: NADC, Warminster, PA; NAC, Indianapolis, IN; NWSG, Crane, IN; NATC, Patuxent River, MD, NSWC, White Oak, MD. **CONTRACTORS:** ERAPSCO (MAGNAVOX, FT WAYNE, IN/SPARTAN, JACKSON, MI).

F. (U) RELATED ACTIVITIES: Program Element 0604221N P-3 Modernization Program

G. (U) OTHER APPROPRIATION FUNDS: Other procurement Navy funding in the out years.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604261N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Acoustic Search Sensors
PROJECT NUMBER: H0480 PROJECT TITLE: ASW Sensors and Processing

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
H0480	ASW Sensors and Processing	2,791	13,051	33,556	CONT.	CONT.

B. (U) DESCRIPTION: This project provides improved air ASW mission effectiveness through engineering development of hardware and software associated with acoustic systems, sensors, processing, post-processing, data recording, and displays for air ASW platforms. The Acoustic Intercept System (AIS) is a which will be integrated into the P-3 Update III lead platform. The Generic Acoustic Stimulator System (GASS) is an ocean, sensor and target modeling combination which couples with all ASW trainers.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Acoustic Intercept System (AIS)
 - 1. Released formal Request for Proposal.
 - 2. Evaluated Proposals.
 - 3. Initiated AIS/P-3 Update III integration.

2. (U) FY 1992 PROGRAM:

- a. (U) AIS
 - 1. Award Engineering & Manufacturing Development contract for the AIS detector development.
 - 2. Complete Preliminary Design Review.
 - 3. Continue AIS/P-3 Update III integration.
 - 4. Conduct detector Software Systems Requirements Review.
 - 5. Initiate contractor design/performance tests.
- b. (U) Generic Acoustic Stimulator System (GASS)
 - 1. Develop interface and performance specifications for GASS.
 - 2. Initiate development of the Engineering Development Model. (EDM).
 - 3. Conduct Software Specification Reviews.
 - 4. Conduct System Design Reviews.

3. (U) FY 1993 PLANS:

- a. (U) AIS
 - 1. Conduct Critical Design Review.
 - 2. Continue AIS/P-3 Update III integration and test.
 - 3. Conduct detector Software Test Requirements Review.
- b. (U) GASS
 - 1. Conduct Preliminary Design Review.
 - 2. Conduct Critical Design Review.
 - 3. Conduct Software/Hardware interface demonstration.
 - 4. Conduct Test Readiness Review.
 - 5. Conduct Milestone II documentation and decision meeting.
 - 6. Initiate prototype procurement and preparation.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604261N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Acoustic Search Sensors
PROJECT NUMBER: H0480 **PROJECT TITLE:** ASW Sensors and Processing

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAC, Indianapolis, IN; NADC, Warminster, PA; NOSC, San Diego, CA; NWSC, CRANE, IN; and NATC, Patuxent River, MD.
CONTRACTOR: TED.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) Technology Changes: None.
2. (U) Schedule Changes: None.
3. (U) Cost Changes: The FY93 increase of \$16,037K is required for the Generic Acoustic Simulator System EDM development which is used in a weapon system trainer demonstration.

F. (U) PROGRAM DOCUMENTATION:

AIS

ORD 12/91
AP 10/91
IPS (In Process)
TEMP (In Process)
COREA (In Process)

GASS

TDRD 7/91
AP (In Process)
IPS (In Process)
TEMP (In Process)

G. (U) RELATED ACTIVITIES: Program Element 0603254N, AIR ASW
Program Element 0604221N, P-3 Modernization Program (host platform)

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE:

	MSII	DT-IIA	OT-IIA	MS-III
AIS (FY)	2/92	8/95	1/96	9/96
GASS (FY)	4/94	-	-	2/96

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604261N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Acoustic Search Sensors
PROJECT NUMBER: H2000 PROJECT TITLE: Air Deployed Active Receiver

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
H2000	Air Deployed Active Receiver	10,284	8,390	13,128	26,403	58,205

B. (U) DESCRIPTION: The Air Deployed Active Receiver (ADAR) sonobuoy is an expendable air launched acoustic receiver utilized by ASW aircraft to receive pulses from air deployed sources. Intended mission areas include contact redetection, barrier protection, screening operations, and area search and surveillance.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Initiated processor software development.

b. (U) Initiated S-3B/ADAR integration.

2. (U) FY 1992 PROGRAM:

a. (U) Complete Milestone (MS) II.

b. (U) Award Engineering and Manufacturing Development contract.

c. (U) Continue ADAR Air Common Acoustic Processing (ACAP) (UYS-1) software development.

d. (U) Continue S-3B/ADAR design and integration.

3. (U) FY 1993 PLANS:

a. (U) Complete contractor detailed design.

b. (U) Complete sonobuoy Preliminary Design Review.

c. (U) Initiate contractor engineering tests.

d. (U) Continue S-3B/ADAR integration.

e. (U) Continue ADAR ACAP software integration.

4. (U) PROGRAM TO COMPLETION: Complete TECHEVAL/OPEVAL and initiate production procurement.

D. (U) WORK PERFORMED BY: IN-HOUSE: NADC, Warminster, PA; NAC, Indianapolis, IN; NWSC, Crane, IN; NATC, Patuxent River, MD. CONTRACTOR: TED.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not Applicable.

2. (U) Schedule Changes: Not Applicable.

3. (U) Cost Changes: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604261N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Acoustic Search Sensors
PROJECT NUMBER: H2000 PROJECT TITLE: Air Deployed Active Receiver

F. (U) PROGRAM DOCUMENTATION:

AP	8/91
ORD	12/91
TEMP	3/92
IPS	(In Process)
CORA	(In Process)

G. (U) RELATED ACTIVITIES:

Program Element 0603254N, AIR ASW (advanced development)
Program Element 0603708N, ASW Signal Processing (detection algorithm development)
Program Element 0604221N, P-3 Modernization Program

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) MILESTONE SCHEDULE:

MS II	4/92
TECHEVAL	2/97
OPEVAL	5/97
MS III	8/97

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604264N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Aircrew Systems Development
PROJECT NUMBER: W0606 PROJECT TITLE: Aircrew Systems Development

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT		FY 1991	FY 1992	FY 1993	TO	TOTAL
NUMBER	TITLE	ACTUAL	ESTIMATE	COMPLETE	PROGRAM	
W0606	ASD	18,111	21,207	18,246	Continuing	

B. (U) DESCRIPTION: This program provides engineering development, and test and evaluation of aircrew life support systems which enhance mission performance; protects from natural and generated stresses and hazards; and integrates with in-flight escape and rescue provisions. Program includes the adaptation of nondevelopment items, joint service developments, and pursuit of NATO/allied cooperative ventures, and integration with existing Navy aviation life support systems (ALSS), aircraft and maintenance/logistics processes.

SUBPROJECTS: a. IN-FLIGHT SYSTEMS: On Board Oxygen Generating System, (OBOGS), Advanced Technology Crew Station (ATCS), Advanced Tactical Life Support System (ATLSS) - Navy Combat Edge, Solid Chemical Oxygen Emergency System (SCOES); b. ESCAPE/CRASH SAFETY: Naval Aircrew Common Ejection Seat Pre-Planned Product Improvement (NACES P³I), Advanced Crashworthy Aircrew Seat System (ACASS), Inflatable Body and Head Restraint System (IBAHRS); c. SURVIVAL AND RESCUE: Passenger Anti-Exposure Survival System (PAESS); d. SPECIAL MISSION EQUIPMENT: Laser Eye Protection Visor (LEPV), Naval Aircrew Eye Respiratory Protection (NAERP); e. MISSION SPECIFIC: Helicopter Helmet Replacement Program (HHRP), Aircrew Integrated Survival Armor Protection (AISAP), Cats-Eye Emergency Detachment System (CEEDS).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:

a. (U) OBOGS: Conducted Development Tests (DT) and initiated redesign of P³I monitor. ATCS: Development of proposed design, guidelines and design tools. SCOES: Prepared request for proposal for development contract.

b. (U) NACES P³I: DT-I/II restraint systems evaluation. ACASS: Completed DT-I and began DT-II. IBAHRS: Source selection and developmental contract awarded.

c. (U) PAESS: Contract for hardware awarded.

d. (U) Special Mission Equipment. NAERP: Completed P-3C TECHEVAL.

e. (U) HHRP: Down selection to one source. AISAP: Completed Phase I Development Testing. CEEDS: Procured prototypes, lab test, procured preproduction units.

2. (U) FY 1992 Program:

a. (U) OBOGS: Finalize P³I monitor design, conduct aircraft fit checks, and conduct DT. ATLSS: Conduct DT, identify aircrew medical qualification requirements and procure TECHEVAL/OPEVAL hardware. ATCS: Complete DT design guidelines and specification revisions. SCOES: Award development contract.

b. (U) NACES P³I: Conduct design analysis and DT for a 700 knot system, complete DT-I/II for restraint system, commence development of an improved high performance sequencer system, initiate TECHEVAL. ACASS: DT-II testing, level II/III data package. IBAHRS: Start and complete DT-I, start DT-II testing.

c. (U) PAESS: Conduct development test and prepare ECP.

d. (U) NAERP: AV-8B TECHEVAL.

e. (U) HHRP: OPEVAL, Approval for Full Rate Production (AFRP), Initial Operational Capability (IOC). AISAP: Conduct Phase II DT. CEEDS: Formalize specifications and data package, begin Integrated Logistics Support (ILS), prepare and approve ECP.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604264N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Aircrew Systems Development

PROJECT NUMBER: W0606

PROJECT TITLE: Aircrew Systems Development

3. (U) FY 1993 Plans:

a. (U) OBOGS: Prepare ECP for P³I monitor. ATLSS: Conduct TECHEVAL. ATCS: DT-I subsystem testing/verification of design tools. SCOE: Conduct DT.

b. (U) NACES P³I: Complete DT-II effort on 700 knot system, evaluate and demonstrate improved sequencer system, complete technical evaluation and prepare ECP. ACASS: Complete DT-II testing. IBAHRS: Complete DT-II testing, prepare ECP, AFRP.

c. (U) LEPV: Start DT. NAERP: AFRP for AV-8B, DT for remaining USN/USMC aircraft.

d. (U) CEEDS: Award contract, IOC. AISAP: Prepare ECP.

4. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRDEVCEW, Warminster, PA; NAVORDSTA, Indian Head, MD; NAVAIRTESTCEN, Patuxent River, MD; NAVWPNCEN, China Lake, CA; NADEP, Norfolk, VA; OPTEVFOR, Norfolk, VA; NAC, Indianapolis, IN. CONTRACTORS: Martin Baker Aircraft Co, Ltd., Middlesex, England; Litton Industries, Davenport, IA; McDonnell Aircraft Co, St. Louis, MO; Boeing Advanced Systems Co, Seattle, WA.

E. (U) COMPARISON WITH FY 1992/1993 PRESIDENT'S BUDGET

1. (U) TECHNOLOGY CHANGES: None.

2. (U) SCHEDULE CHANGES: None.

3. (U) COST CHANGES: The FY 1993 increase of \$1,157K reflects miscellaneous departmental adjustments, such as DBOF and NIF rates.

F. (U) PROGRAM DOCUMENTATION:

	OR	TEMP	ECP		OR	TEMP	ECP
OBOGS	4/75	5/83	4/93	PAESS	8/86	NA	7/92
ATCS	9/89	NA		LEPV	6/86	NA	6/94
ATLSS	2/92	3/92	NA	NAERP	11/86	6/89	NA
SCOE	4/75	4/92	NA	HHRP	1/88	5/90	NA
NACES P ³ I	12/83	12/89	2/94	AISAP	3/88	5/92	4/93
ACASS	9/88	NA	4/94	CEEDS	2/86	NA	7/92
IBAHRS	9/88	NA	2/93				

G. (U) RELATED ACTIVITIES: P.E. 0602122N, Aircraft Technology; P.E. 0602233N, Mission Support Technology; P.E. 0603216N, Aircrew Systems Technology. Related Air Force efforts, support by P.E. 0604706F, Life Support Equipment, and Army efforts, supported by P.E. 0604713A, Combat Feeding, Clothing and Equipment. Coordinated through the OSD sponsored Tri-Service Life Support RDT&E Steering Committee.

H. (U) OTHER APPROPRIATION FUNDS: None

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None

J. (U) MILESTONE SCHEDULE:

II III

NAERP		3Q/93
HHRP		3Q/92
ATLSS	2Q/92	4Q/94

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604268N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: A/C ENGINE COMPONENT IMPROVEMENT PROGRAM (CIP)
PROJECT NUMBER: W1355 PROJECT TITLE: A/C ENGINE COMPONENT IMP PROGRAM (CIP)

A. (U) RESOURCES: (Dollars In Thousands)

PROJECT NUMBER TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE Cont.	TOTAL PROGRAM Cont.
W1355 A/C Engine CIP	36,715	49,649	65,973		

B. (U) DESCRIPTION: CIP provides critical sustaining engineering support for in-service Navy aircraft engines, transmissions, propellers, starters, auxiliary power units, electrical generating systems, fuel systems, and fuels and lubricants. CIP addresses all safety-of-flight issues (highest priority), corrects service-revealed deficiencies, improves operational readiness (OR) and Reliability and Maintainability (R&M), reduces engine Life Cycle Cost (LCC), maintains specification performance, and conducts testing to qualify engineering changes and verify life limits. Historically, the missions, tactics, and environmental exposure of military aircraft systems keep changing to meet new threats or operational demands, and often result in unforeseen problems which, if not corrected, can cause critical safety/readiness degradation, such as that experienced during DESERT SHIELD/DESERT STORM operations due to sand erosion. In addition, numerous new problems arise through actual use during deployment, production and service. Development programs, while geared to resolve as many problems as possible before deployment, cannot duplicate actual operations or account for the vast array of environmental and usage variables. Therefore, it is essential to provide continuing engineering efforts on these systems. CIP starts after engine development and Navy acceptance of the first production engine. CIP continues over the engine's life, gradually decreasing to a minimum level sufficient to keep older inventory operational. CIP addresses usage and life problems not covered by engine warranties. CIP is a tri-service program with Foreign Military Sales participation. CIP efforts significantly reduce Operations and Maintenance (O&M) and spares costs, providing an average return on investment of 16 to 1.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Continued effort on each engine to reduce in-flight aborts, aircraft safety incidents, not-mission-capable rates, scheduled and unscheduled engine removals, maintenance work hours, and overall costs.

b. (U) Effort included 1,514 ground test hours (1,433 sea level test hours, 81 altitude test hours) and 50 flight test hours to analyze, verify, and approve 187 CIP tasks (177 redesign/analysis tasks, 10 repair tasks), generating an estimated \$640M LCC savings.

c. (U) F110 Engine (F-14B TOMCAT AND F-16N FALCON) - Qualified an afterburner improvement to eliminate recurring 10 hour safety-of-flight inspection. Developed updated diagnostic and fault isolation software which eliminated numerous false failure indications and unneeded maintenance.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604268N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: A/C ENGINE COMPONENT IMPROVEMENT PROGRAM (CIP)

PROJECT NUMBER: W1355 PROJECT TITLE: A/C ENGINE COMPONENT IMP PROGRAM (CIP)

d. (U) F404 Engine (F/A-18 HORNET) - Qualified multiple changes to eliminate engine-related mishaps, including compressor improvements to correct premature fan disk cracking, afterburner/exhaust nozzle improvements to correct fuel leaks/fire hazards and improve actuator seal durability. Redesign the combustion liner to eliminate cracking and developed new fuel nozzle with a 300% life improvement.

e. (U) F402 Engine (AV-8B HARRIER) - Developed changes to extend the hot section inspection interval from 500 hrs to 750 hrs, resulting in \$8M/yr savings. Completed evaluation of sand ingestion effects in support of DESERT SHIELD/DESERT STORM and initiated corrective actions.

f. (U) J52 Engine (TA-4J SKYHAWK, A-6E INTRUDER, AND EA-6B PROWLER) - Developed hardware to improve compressor reliability and reduce fuel leaks and vibration. Developed numerous turbine repairs.

g. (U) T700 Engine (SH-60 SEAHAWK) - Developed control system improvements to resolve serious safety issues that resulted in compressor stalls and inflight shutdowns. Implemented improvements to the engine digital fuel control to address electromagnetic interference (EMI) incompatibility.

h. (U) TF34 Engine (F-3 VIKING) - Completed efforts to eliminate stall overtemp operational deficiency, double service life of high pressure turbine blade material, and correct fuel fumer fleet safety concerns.

i. (U) T64 Engine (H-53 Helicopter/Minesweeper) - Completed testing to define Low Cycle Fatigue lives so that parts can be removed prior to rupture. Completed evaluation of DESERT STORM engines and identified corrective actions.

j. (U) PROPELLERS - Increased F-3 and E-2/C-2 prop life to 7500 hours and 6500 hours, respectively, resulting in an estimated \$3.5M/yr savings in overhaul costs.

2. (U) FY 1992 PROGRAM:

a. (U) Continue effort on each engine to reduce in-flight aborts, aircraft safety incidents, not-mission-capable rates, scheduled and unscheduled engine removals, maintenance work hours, and overall costs.

b. (U) Effort will include 3,325 ground test hours (3,225 sea level test hours, 100 altitude test hours) and 150 flight test hours to analyze, verify and approve 206 CIP tasks (186 redesign/analysis tasks, 20 repair tasks), generating an estimated \$700M LCC savings.

3. (U) FY 1993 PLANS:

a. (U) Continue effort on each engine to reduce in-flight aborts, aircraft safety incidents, not-mission-capable rates, scheduled and unscheduled engine removals, maintenance work hours, and overall costs.

b. (U) Effort will include 5,775 ground test hours (5,525 sea level test hours, 250 altitude test hours) and 350 flight test hours to analyze, verify and approve 291 CIP tasks (236 redesign/analysis tasks, 45 repair tasks), generating an estimated \$900M LCC savings.

c. (U) Begin CIP effort on the F405 engine for the T-45 aircraft and enhanced performance versions of engines for the F/A-18 and AV-8B aircraft which are entering the inventory for the first time and require CIP effort to resolve anticipated service-revealed deficiencies.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604268N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: A/C ENGINE COMPONENT IMPROVEMENT PROGRAM (CIP)
PROJECT NUMBER: W1355 PROJECT TITLE: A/C ENGINE COMPONENT IMP PROGRAM (CIP)

d. (U) Major tasks will include lead-the-fleet testing on the F402 (AV-8B), F404 (F/A-18), F110 (F-14B) and J52 (A-4/A-6) engines to verify life limits and detect failure modes in advance of fleet operations, and resolving major engine safety problems on the AV-8B and SH-60 aircraft.

4. (U) PROGRAM TO COMPLETION: This is a continuing program. CIP will be continued on in-service engines until inventory phase-out to reduce in-flight aborts, aircraft safety incidents, not-mission-capable rates, scheduled and unscheduled engine removals, maintenance work hours, and overall costs.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAPC, Trenton, NJ; NATC, Patuxent River, MD; NADC, Warminster, PA; and NWSC, Crane, IN. CONTRACTORS: Allison Gas Turbine Division, Indianapolis, IN; General Electric Company, Lynn, MA and Evendale, OH; Garrett Turbine Engine Co., Phoenix, AZ; Pratt and Whitney Aircraft Group, West Palm Beach, FL; and Rolls-Royce, Bristol, England.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: Not applicable.
2. (U) SCHEDULE CHANGES: Not Applicable.
3. (U) COST CHANGES: The reduction of \$2.02M in FY 93 reflects various pricing adjustments.

F. (U) PROGRAM DOCUMENTATION: Acquisition Plan No. AIR-91-06 approved 21 March 1991.

G. (U) RELATED ACTIVITIES: PE 0604268F and 0203752A (Air Force and Army CIP). CIP is a tri-service program which includes cost sharing with commercial and foreign users, where applicable. Each service administers the engine contract for engines they developed with the other services as members, therefore, eliminating unnecessary duplication of effort.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS:

- Description: Component Improvement Program for F402 Engines.
- Participants: United Kingdom and 12 other nations participate.
- Financial Commitments: USN and the UK each pays 50% on common engine work and 100% for unique work.
- Effective date: 22 October 1969
- DOD funding: Estimated USN F402 CIP funding for FY 93 is \$12M, the UK also provides \$12M.

J. (U) MILESTONE SCHEDULE: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604270N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: CONSOLIDATED EW PROGRAM

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C0066	C/NOONH ECM	2,399	125	45	0	12,495
C1961	MEWS8	1,874	997	0	1,378	9,144
E0619	ASPJ DEV	11,419	0	0	0	265,439
R1742	EW TECH DEV	906	919	1,062	Cont.	Cont.
R1882	DVAL	1,393	801	791	Cont.	Cont.
S0954	SURFACE EW	45,390	35,011	35,738	Cont.	Cont.
E0556	EW CNT RES	10,777	23,864	32,320	32,643	649,381
W0638	ABW DEF ECM	66,820	46,277	66,947	Cont.	Cont.
X1794	COUNTER COMM	3,200	0	0	0	3,200
X1795	CMAS	3,629	Moved to PE 0605853N			
	TOTAL	147,807	107,994	136,903	Cont.	Cont.

B. (U) DESCRIPTION: This element includes development of electronic warfare systems for USN/USMC tactical aircraft, USMC helicopters, surface combatants, data-link vulnerability assessments, USMC communications and non-communications jammers, and development and testing of electronic warfare devices for emergency contingencies. ASPJ develops defensive electro-magnetic countermeasure system for self-protection of tactical F-14s, F/A-18s and F-16s.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604270N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: EW Development Program
PROJECT NUMBER: C0066 PROJECT TITLE: COMM and NON-COMM CM SPT

C. (U) DESCRIPTION: The goal of this program is to satisfy the continuing requirement for COMM/NON-COMM ECM systems which will provide the Marine Corps the ability to jam/deceive enemy transmitters. An expendable jammer installed on the very low cost Unmanned Aerial Vehicle (UAV) will provide the capability to aid in the disruption of rear echelons of enemy troop communications. A standoff communications jammer is required for Very High Frequency (VHF) and Ultra High Frequency (UHF) as a replacement for the currently fielded AN/ULQ-19 jammer. A similar requirement also exists for a system capable of jamming High Frequency (HF) communications.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Completed jammer development and integration with designated joint project office (JPO) UAV.

b. (U) Continued monitoring U.S. Navy's USQ-113V communications jammer program.

2. (U) FY 1992 PROGRAM:

a. (U) Complete testing and documentation for expendable jammer procurement.

b. (U) Successful DT testing completed in November.

3. (U) FY 1993 PLANS: Initiate contracting for expendable jammers.

4. (U) PROGRAM TO COMPLETION: This program completes in FY 1993.

E. (U) WORK PERFORMED BY: IN-HOUSE: Naval Air Test Center, Patuxent River, MD and Army Proving Grounds, Dugway, UT. CONTRACTORS: Rockwell-Collins, Cedar Rapids, IA and Noise Com, Paramus, NJ.

F. (U) RELATED ACTIVITIES: US Navy, USQ-113V Communications Jammer.

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604270N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Consolidated EW Program

PROJECT NUMBER: R1742

**PROJECT TITLE: EW Technical Development
and Testing**

C. (U) DESCRIPTION: Establishes a standing research group for developing and testing low cost, high payoff Electronic Warfare systems to meet warfighting requirements during crisis situations. The goal is to develop and provide low-cost high-payoff EW systems in a 12 month period during non-crisis conditions, and be able to surge to a 30-day response during crisis conditions.

D. (U , PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENT:

This task was an emergent DESERT SHIELD/STORM quick response. It interrupted the originally scheduled development of the

2. U) FY 1992 PROGRAM:

The concept will use a multi-element, linear interferometer array which will be coupled with multi channel phase matched receiver and antenna. A simplified signal processor will also be developed as part of this system.

3. U . FY 1993 PLANS: Develop and test a system to deploy an infared

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: Naval Research Laboratory, Washington D.C.; Pacific Missile Test Center, Pt. Mugu, CA; Naval Weapons Center, China Lake, CA; Naval Ordnance Laboratory, Crane, IN.

F. (U) RELATED ACTIVITIES: Not Applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604270N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: EW Development

PROJECT NUMBER: R1882 PROJECT TITLE: Datalink Evaluation Analysis (DVAL)

C. (U) DESCRIPTION: DVAL evaluates the anti-jam capabilities of Navy electromagnetically dependent systems in the developmental stages of the acquisition cycle. It identifies methods for reducing signal vulnerabilities to hostile exploitation. The resultant information is used during development to take corrective action when necessary. It is also used after fleet introduction for use in developing countermeasure tactics. It incorporates another facet of vulnerability assessment, Electronic Counter-Counter Measures (ECCM) Requirements and Assessment Manual (ERAM) which, when completed, will provide a tool for program sponsors and managers to clearly state ECCM requirements "up front" in the R & D process. ERAM consists of five manuals (increments) providing realistic engagement scenarios and measures of effectiveness to facilitate writing of contract specifications, defining testing environment, and providing tools for fleet training and tactics.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Continued preliminary analysis of Common High Bandwidth DataLink (CHBDL). Began analysis of HAVE QUICK/SINGARS systems. Began revision of DVAL Methodology. Revised draft of ERAM Increment III (Surface to Air); released revision 2 of Increment I.

2. (U) FY 1992 PROGRAM:

a. (U) Develop CHBDL preliminary susceptibility reports. Continue preliminary analysis of HAVE QUICK/SINGARS. Continue revision of DVAL Methodology. Develop preliminary analysis of Battle Group Cooperative Engagement Concept (BGCEC). Perform CLASSIC RAPTOR test and analysis. Assist in Military Strategic, Tactical, and Relay Satellite (MILSTAR) Follow-on Test & Evaluation (FOT&E).

b. (U) Publish ERAM Increment III; release ERAM Increment II revision 1, produce working draft ERAM Increment IV (Air to Surface).

3. (U) FY 1993 PLANS:

a. (U) Develop CHBDL susceptibility pre-test planning document and preliminary Interceptability reports. Complete HAVE QUICK/SINGARS Interceptability module and begin assessability/feasibility pre-test planning document. Continue development of BGCEC. Complete revision of DVAL Methodology. Begin analysis of TACINTEL II/Integrated Special Intelligence Communications (INSICOM). Continue CLASSIC RAPTOR test and analysis. Continue to assist in MILSTAR FOT&E.

b. (U) Publish ERAM Increment IV; produce draft Increment V; release revision 3, ERAM Increment I; release revision 2, ERAM Increment II; release revision 1, ERAM Increment III.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington DC; NAVAIRTESTCEN (NATC), Patuxent River, MD; Naval Ocean Systems Center (NOSC); CONTRACTORS: Johns Hopkins University, Applied Physics Laboratory, Laurel, MD; Georgia Tech Research Institute (GTRI), Atlanta, GA; ERAM work performed by NWC China Lake, CA.

F. (U) RELATED ACTIVITIES: PR 0603261N TAC AIRBORNE RECON

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604270N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: EW Development

PROJECT NUMBER: 80954 PROJECT TITLE: Shipboard EW Improvements

A. (U) RESOURCES (Dollars in Thousands)

PROJECT	FY 1991	FY1992	FY 1993	To	Total
NUMBER TITLE	ACTUAL	ESTIMATE	ESTIMATE	COMPLETE	PROGRAM
S0954 Shipboard EW Improvements	45,390	35,011	35,738	CONT.	CONT.

B. (U) DESCRIPTION: The Shipboard EW Improvements Program includes the following major efforts: (1) AN/SLQ-32(V) Improvements which include; Advanced Capability (ADCAP)-Improves Active Countermeasure capability; AN/SLQ-32(V) Phase E-Improves threat detection capability. (2) Decoy Integration (DDI) - Integration of MK36 Decoy launching System with AN/SLQ-32A(V) Shipboard Electronic Countermeasures System. (3) Rapid ASM Integrated Defense System (RAIDS) - A phased Rapid Development initiative to improve the ability of surface combatants to perform Anti-Ship Missile Defense (ASMD). (4) NULKA - a joint US/Australia project to develop an Anti-Ship missile decoy system capable of seduction. (5) Advanced Torch Decoys - this program develops ship launched decoys capable of seduction and distraction of Infrared (IR) homing Anti-Ship Missiles. The MK186 MOD 2 TORCH provides improved flame characteristics. (6) Offboard Active Counter Measure (OACM) - an active distraction payload for use on unmanned/surface and airborne vehicles. (7)

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS

- (U) ADCAP Increase-in-Scope effort awarded.
- (U) Continued DDI full-scale S/W development.
- (U) Conducted RAIDS At-Sea Demo.
- (U)

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- (U) NULKA DT-IIA completed.
- (U) NULKA-Conducted captive carry in Australia of NULKA payload.
- (U) NULKA-HERO and EMI testing completed.
- (U) OACM-Developed EW mission breadboard payload.
- (U) OACM-Completed EMI testing of breadboard payload.
- (U) TORCH-Completed DTIIA/DTIIB.
- (U) OACM-Developed specification for portable breadboard EW payload for UAV Helo ship use.

2. (U) FY 1992 PROGRAM:

- (U) Award FSED contract for AN/SLQ-32(V) Phase E.
- (U) DDI - Conduct testing DT-IIID/DT-IIIE.
- (U) ADCAP - Conduct EDM factory testing.
- (U) RAIDS - Initiate DT-IIA/OT-IIA.
- (U)

OPEVAL on FFG-

7/Conduct FOT&E for DD-963; start full rate production for FFG-7/Install RCSC package on CG-47 Class.

- (U) NULKA - Conduct DTIIB/E in Australia.
- (U) NULKA - Conduct DTIIC /C/D/OTIIA in U.S. Continue Captive Carry testing in U.S/Australia.
- (U) NULKA - Conduct System CDR of Vehicle and Launching Systems.
- (U) OACM - Complete ORD.
- (U) TORCH-Conduct DTIIC/OTIIA/Request APP.
- (U) Support analysis/trade-off studies to coordinate and refine element roles within ship self defense strategy; support development of system interface adaptations as necessary to provide effective ship self defense integration.

3. (U) FY 1993 PLANS:

- (U) Continue AN/SLQ-32(V) EPU FSED, PDR, CDR.
- (U) ADCAP-Conclude FSED; Conduct DTIIA,DTIII Testing.
- (U) Conduct DDI DTIIIF/DTIIIG testing.
- (U)

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604270N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: EW Development

PROJECT NUMBER: S0954 PROJECT TITLE: Shipboard EW Improvements

e. (U) TORCH/FLIRT - Complete DTIIA/Level III tech package.
f. (U) Support continuing analysis/trade-off studies and implementation of functional and performance allocations among elements comprising integrated ship self defense systems, including system interface adaptations and preparation/conduct of associated test and demonstrations.

g. (U) RAIDS - Comple RAIDS DT/OT and submit for MS III approval for production.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: In-House: NRL, Washington, DC; NSWC, Dahlgren, VA and White Oak, MD; NSWC, Crane IN; NOC, San Diego, CA. Contractors: Raytheon, Goleta, CA; Sippican, Marion, MA; ANADI, Melbourne, Australia; Rubatex Corp, Bedford, VA.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENTS BUDGET:

1. (U) TECHNOLOGY CHANGES: Not Applicable.
2. (U) SCHEDULE CHANGES: Not Applicable.
3. (U) COST CHANGES: FY93 \$4.6M decrease associated with pricing adjustments to finance DBOP rate increases and a reduction for AIEWS and OACH development based on the lack of an operational requirement.

F. (U) PROGRAM DOCUMENTATION:

1. (U) Phase E. TEMP III-IE in process.
2. (U) DDI TEMP Jun 84; Update in process.
3. (U) ADCAP TEMP in process, submitted to COTF for informal review 1/92.
4. (U) RAIDS RFP in process. RAIDS TEMP signed 91/1Q.
5. (U) NULKA Joint TEMP signed by USN OCT 88.Rev.1 in process.
6. (U) OACH-TOR 09/90; ORD in preparation.
7. (U) OUTLAW BANDIT OR 05/87; TEMP 03/90; AP 08/90.

G. (U) RELATED ACTIVITIES: Not Applicable.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991	FY 1992	FY 1993	TO	TOTAL	
OPN	ACTUAL	ESTIMATE	ESTIMATE	COMPLETE	PROGRAM	
(P-1 #67) SLQ-32		83,792	129,475	126,912	CONT.	CONT.
(P-1 #193) ASMD Systems		2,381	3,346	3,177	CONT.	CONT.
(P-1 #200) Shipboard Expn		51,300	25,806	45,246	CONT.	CONT.
(P-1 # 73) OUTLAW BANDIT		7,046	23,367	30,570	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NULKA, a joint US/Australia project to develop an anti-ship missile decoy system capable of seduction. Memorandum of Agreement with Australia was signed in Aug 1986. Total program cost in U.S. dollars \$94 million; U.S share of the common work is 78%, Australia - 22%. The U.S is responsible for developing the electronic payload. Australia is responsible for developing the rocket motor, flight control systems, launcher and the final system integration. Program is in EMD phase. The Navy plans to start a cooperative program with the U.K. in FY 1993 for Anti-Ship Missile Countermeasures.

J. (U) MILESTONE SCHEDULE:

1. (U) DDI DT-IIIE/OT-IIIB at-sea test FY92/3QTR; DT-IIIG OT-IIIC, FY93/2QTR.
2. (U) SLQ-32 (ADCAP)-DDI DT/OT At-Sea test 93/2Q.
3. (U) SLQ-32 PHASE E FSED FY91/4QTR.
4. (U) RAIDS DT-IIA FY92/2QTR.
5. (U) RAIDS IOC FY93/1QTR.
6. (U) NULKA DT-IIA FY92 1QTR/DTIIC FY92 2QTR.
7. (U) NULKA DTIIB FY92/3Q;DTIIC,DTIID,DTIIE,OTIIA FY92/4Q.
8. (U) NULKA MS-IIA (LRIP) FY93/3Q.
9. (U) TORCH-DTIIA FY91/2Q;DTIIB FY91/4Q/DTIIC FY92/2Q.
10. (U) TORCH-OTIIA FY92/2Q; AFP FY92/3Q.
11. (U) DT/OT OUTLAW BANDIT FY91/4QTR.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604270N BUDGET ACTIVITY: 4
 PROGRAM ELEMENT TITLE: EW DEVELOPMENT
 PROGRAM NUMBER: E0556 PROJECT TITLE: EW COUNTER RESPONSE

Picture Not Available

POPULAR NAME: EA-6B ADVANCED CAPABILITY (ADVCAP)

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program		IIA(ADVCAP)	III(BAND 2/3)	N/A
Milestones		6/92	2/93	
Engineering				
Milestones				N/A
T&E		DT IIF/OT IIA	DT IIH/OT IIB	
Milestones		11/91(ADVCAP)	10/92(BAND 2/3)	
Contract		LRIP(ADVCAP)	APP(BAND 2/3)	
Milestones		6/92	2/93	
BUDGET (\$K)	FY 1991	FY 1992	FY 1993	TO COMPLETE
				PROGRAM TOTAL
Major	\$ 5,050	\$15,200	\$17,426	\$ 18,000
Contract				\$379,200
Support				\$ 0
Contract	\$ 0	\$ 0	\$ 0	\$ 0
In-House	\$ 5,033	\$ 8,664	\$14,894	\$ 14,643
Support				\$269,500
GFE/				0
Other	681	-	-	681
Total	\$10,777	\$23,864	\$32,320	\$649,381

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604270N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: EW DEVELOPMENT
PROGRAM NUMBER: 80556 PROJECT TITLE: EW COUNTER RESPONSE

B. (U) DESCRIPTION: The EA-6B Weapon System is designed for jamming and destruction of enemy landbased, shipborne and airborne command, control and communications (C3) and radars associated with early warning, target acquisition, surveillance, anti-aircraft artillery, and air-to-surface, surface-to-surface and surface-to-air missiles. In this capacity, it will support carrier based tactical aircraft and battle group operations in dense radar controlled environments. The efforts under this program element provide for the electronic countermeasure response to these advanced threat weapon systems and C3 networks which are expanding in density and technical complexity. This program element funds the continuing development and/or integration of all Electronic Warfare (EW) systems for the EA-6B Electronic Countermeasures Support Aircraft and includes enhancements to the air vehicle to accommodate these EW improvements. Major efforts include the development and integration into the EA-6B of a new Advanced Capability (ADVCAP) Receiver Processor Group (RPG), a communications and radar countermeasures set (AN/ALQ-149), a Universal Exciter Upgrade (UEU), a Coherent Countermeasures (COCM) Capability, Proforma Countermeasures (PCM) Capability and Band 2/3 Transmitter.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Continued qualification testing, Reliability Development Testing (RDT) and Electromagnetic Interference (EMI) testing on RPG.
- b. (U) Continued PCM software development for initial baseline ADVCAP capability.
- c. (U) Continued integration of RPG and ALQ-149 on EA-6B.
- d. (U) Continued software development and logistics support development for the RPG and ALQ-149 (ADVCAP).
- e. (U) Continued Contractor integration/test Band 2/3 Transmitter.
- f. (U) Commenced the Universal Exciter Upgrade (UEU) study.
- g. (U) Commenced Coherent Countermeasure Program for the EA-6B.
- h. (U) Completed Navy Developmental and Operational flight testing on HARM block III/IV.
- i. (U) Commenced Technical Upgrade for Teams (TUT) and ADVCAP TEAMS (ATEAMS).

2. (U) FY 1992 PROGRAM:

- a. (U) Complete contractor acceptance test for Band 2/3.
- b. (U) Complete delivery of Band 2/3 EDM's 1 through 5.
- c. (U) USN to complete Band 2/3 qualification, and EMI testing.
- d. (U) Continue software development and logistics support development for the RPG and ALQ-149 (ADVCAP).
- e. (U) Continue integration of the RPG and ALQ-149 on the EA-6B ADVCAP.
- f. (U) Commence the Universal Exciter Upgrade (UEU) Program.
- g. (U) Continue the COCM and PCM Programs.
- h. (U) Conduct developmental and operational testing to support RPG and ALQ-149 Milestone IIA decision planned for FY 1992.
- i. (U) Complete qualification testing, and EMI testing on RPG.
- j. (U) Continue TUT and ATEAMS integration.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604270N BUDGET ACTIVITY: 4
 PROGRAM ELEMENT TITLE: EW DEVELOPMENT
 PROGRAM NUMBER: E0556 PROJECT TITLE: EW COUNTER RESPONSE

3. (U) FY 1993 PLANS:
- a. (U) Continue software development and logistics support development for RPG and ALQ-149 (ADVCAP).
 - b. (U) Continue integration of the RPG and ALQ-149 on the EA-6B ADVCAP.
 - c. (U) Continue UEU Development Program.
 - d. (U) Continue COCM and PCM programs for the EA-6B.
 - e. (U) Complete Band 2/3 Transmitter TECHEVAL/OPEVAL to support Milestone III decision planned for FY 1993.
 - f. (U) Continue TUT and ATEAMS integration.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: COMPAHISTESTCEN, Ft. Mugu, CA; NAVAIRTESTCEN, Patuxent River, MD; NAVWPNCEN, China Lake, CA; NRL, Washington, DC; NAVAIRPROTESTCEN, Trenton, NJ; NAVAIRDEVCEEN, Warminster, PA; NAVAVIONICEN, Indianapolis, IN; and NAVWPNSUPPCEN, Crane, IN; COMOPTEVFOR, Norfolk, VA.

CONTRACTORS: Grumman Aircraft Systems Division, Bethpage, NY; Raytheon Corporation, Goleta, CA; Pratt and Whitney, West Palm Beach, FL; Sanders Associates, Nashua, NH; Teledyne Systems, North Ridge, CA.

- E. (U) COMPARISON WITH FY 1992/1993 PRESIDENT'S BUDGET:

- 1. (U) TECHNOLOGY CHANGES: Not applicable.
- 2. (U) SCHEDULE CHANGES: Not Applicable.
- 3. (U) COST CHANGES: Not applicable.

F. (U) PROGRAM DOCUMENTATION: The RPG and UEU Navy Decision Coordinating Paper (NDCP) was approved in 1985/1Q. The ALQ-149/NDCP was approved in FY 1988/2Q. TEMP 604 has been consolidated into the RPG TEMP (157-10 Revision 2) along with the UEU and Band 2/3 Transmitter. This will be the EA-6B ADVCAP TEMP and will address each of the individual R&D programs. The TEMP 157-10 is currently in review at OSD with final approval expected in FY 92/2Q.

- G. (U) RELATED ACTIVITIES: Not Applicable.

- H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
PROCUREMENT	\$349,649	\$115,160	\$530,013	CONT.	CONT.
APW P-1# - 2					

- I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) TEST AND EVALUATION: This information is included in the FY 1993 Congressional Data Sheets.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604270N

BUDGET ACTIVITY 4

PROGRAM ELEMENT TITLE: CONSOLIDATED EW PROGRAM

PROJECT NUMBER: W0638 PROJECT TITLE: AIRBORNE DEFENSIVE ECM

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE Cont.	TOTAL PROGRAM Cont.
W0638	ABN DEF 66,820		46,277	66,947		

B. (U) DESCRIPTION: This project develops various Electronic Warfare (EW) equipments including Radar Warning Receivers (RWRs), Defensive Electronic Countermeasures (DECM), Radio Frequency Counter Measures (RFCM), Infrared jammers (IR), expendable devices (flares, chaff and electronic expendables), laser warning receivers and missile warning equipments to increase aircraft survivability, and former Soviet threat training simulators for use by the Fleet Electronic Warfare Support Group (FEWSG). Numerous laboratory EW efforts (hardware and software), improvements to existing EW systems, Infrared (IR) decoys, Electro-optical (EO) and laser countermeasures (CM), Electronic Warfare Software Support Activity (EWSSA), and system integration efforts are funded under this project. ASPJ F-I provides a robust countermeasure enhancement to ASPJ for advanced angle tracking threat systems.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Advanced Airborne Expendable Decoy (AAED), ALR-67/Advanced Special Receiver (ASR), Integrated Defense Avionics Program (IDAP), Generic Expendable (GEN-X); Continued Engineering and Manufacturing Development (EMD).
- b. (U) GEN-X and BOL CHAFF: Completed OPEVAL.
- c. (U) APR-39(XE-2): Commenced OPEVAL.
- d. (U) FEWSG: Continued Upgrades to AN/ALT-40, FEWSG Mission and Tactical Simulation Development (TSD) Avionics. Performed engineering analysis, hardware/software development and prototype of mission avionics for the ERA-3B replacement.
- e. (U) IR Decoy, IRCM, and Laser CM: Continued advanced development.
- f. (U) ALE-47: Conducted TECHEVAL on F/A-18D and began HH-60H test and evaluation.
- g. (U) RFCM: Continued technique development.
- h. (U) EWSSA: Continued software development.
- i. (U) AAR-47 F-I: Continued development of software update.
- j. (U) EOCM: Development terminated.
- k. (U) ALQ-164: Commenced OPEVAL

2. (U) FY 1992 PROGRAM:

- a. (U) ALR-67/ASR: Continue EMD, begin DT flight test FY92/4Q, perform Brass Board testing FY92/2Q.
- b. (U) FEWSG: Continue FEWSG Mission and TSD Avionics Upgrades. Complete ALT-40 Upgrade program.
- c. (U) ALE-47: Conduct F/A-18D OPEVAL and production long lead decision (FY92/2Q). Continue HH-60H test and evaluation. Conduct Follow-on Operational Test & Evaluation (FOT&E).
- d. (U) RFCM: Continue technique development.
- e. (U) EWSSA: Continue software development and development of EWSSA lab facilities.
- f. (U) AAED, IDAP: Continue EMD.
- g. (U) APR-39A(XE-2): Complete OPEVAL.

3. (U) FY 1993 PLANS:

- a. (U) ALR-67/ASR: Continue EMD. Continue DT flight test.
- b. (U) FEWSG: Continue FEWSG Mission and TSD Avionics Upgrades.
- c. (U) IR Decoys, IRCM, and Laser CM: Participate with Air Force in Joint advanced development.
- d. (U) RFCM: Continue technique development.
- e. (U) ASPJ F-I: Start F-I EMD.
- f. (U) EWSSA: Continue software development and development of EWSSA lab facilities.
- g. (U) ALE-47: Continue FOT&E on various Navy aircraft. Production decision FY93/1Q.
- h. (U) AAED, IDAP: MS-IIA LRIP FY93/3Q.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604270N BUDGET ACTIVITY 4
 PROGRAM ELEMENT TITLE: CONSOLIDATED EW PROGRAM
 PROJECT NUMBER: WO638 PROJECT TITLE: AIRBORNE DEFENSIVE ECM

1. (U) EOCN: Monitor Defense Advanced Research Projects Agency (DARPA) advanced development.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: COMPACMISTESTCEN, Point Mugu, CA; NAVAIRTESTCEN, Patuxent River, MD; NAVAVIONICCEN, Indianapolis, IN; NAVWPNSCEN, China Lake, CA; NRL, Washington, DC; NAVAIRDEVCEN, Warminster, PA; NAVWPNSUPPCEN, Crane, IN; NAVAIRPROPCEN, Trenton, NJ. CONTRACTORS: Grumman Aerospace, Bethpage, NY; Sanders Associates, Nashua, NH; Raytheon, Goleta, CA; Westinghouse, Baltimore, MD; ITT, Nutley, NJ; Tracor, Austin TX; Loral Infrared and Imaging Systems, Lexington, MA; Hughes Aircraft, Los Angeles, CA.

E. (U) COMPARISON WITH FY 1992/1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not Applicable.

2. (U) SCHEDULE CHANGES: ALR-67/ASR M/S III delayed due to antenna requiring redesign. APR-39A(XE-2) M/S III delayed due to problems with the H-1 tailboom during OPEVAL and aircraft going into maintenance phase inspection. These were resolved and OPEVAL continued. ALE-47 M/S III delayed one quarter due to non-availability of test aircraft. BOL Chaff M/S III delayed 2 quarters due to delay in OPEVAL.

3. (U) COST CHANGES: Funding reduction of \$7402K in FY93 associated with pricing adjustments and reflects termination of F-14 variant of ASPJ P³I. ASPJ P³I for F-14 will be accommodated with the F-18 solution.

F. (U) PROGRAM DOCUMENTATION: The following programs have approved Test & Evaluation Plans, Operational Requirements or approved Master Plans: ASPJ P³I/OR #126-096-88, FEWSG/Master Plan CINCLANTFLT N95/S273 dtd 9/3/91, ALR-67/ASR/TEIN 0521-1 dtd 2/14/87, BOL CHAFF/TEIN 1145-01 dtd 2/15/91, AAED/IDAP/TEIN 1224-01 dtd 3/27/88, GEN-X/TEIN 0767-02 dtd 1/11/91, AAR-47/TEIN 0543 dtd 1/21/89, APR-39/TEIN 0962 dtd 10/22/90

G. (U) RELATED ACTIVITIES: Joint Service programs: APR-39A(XE-2)-Army lead, AVR-2-Army lead, ALE-47-Air Force lead, ALQ-162, AAR-47.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

PROCUREMENT	FY 1991 Actual	FY 1992 Estimate	FY 1993 Estimate	To Complete	Total Program
a. (U) APN-5					
P-1 #56	only a portion of the funding			Cont.	Cont.
P-1 #49	8,646	17,230	6,729	Cont.	Cont.
b. (U) OPN -PE 0204162N					
P-1 #158	4,100	2,510	2,600		

c. Applicable airframe appropriations will have these EW systems installed for training and tactical self-protection. Potential users include P-3B, ERA-3B, UH-1H, OV-10A/D, HH-60, CH-53A/D/E, MH-53E, C-130, NKC-135, EC-24A, CH-46E, CH-53A/D/E, RH-53D, MH-53E, UH-1, AH-1, SH-2F, F/A-18, A-6E, F-14, AV-8B, JP-3E.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENT: BOL CHAFF is a Foreign Weapons Evaluation project with Sweden.

J. (U) MILESTONE SCHEDULE:

	M/S IIA	M/S III
1. (U) AAED	FY93/3Q	FY95/1Q
2. (U) ASR	FY93/4Q	FY94/4Q
3. (U) IDAP	FY93/3Q	FY95/1Q
4. (U) GEN-X	N/A	FY92/2Q
5. (U) APR-39A(XE-2)	N/A	FY93/1Q
6. (U) BOL Chaff	N/A	FY92/4Q
7. (U) ALE-47	N/A	FY93/1Q

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604301N

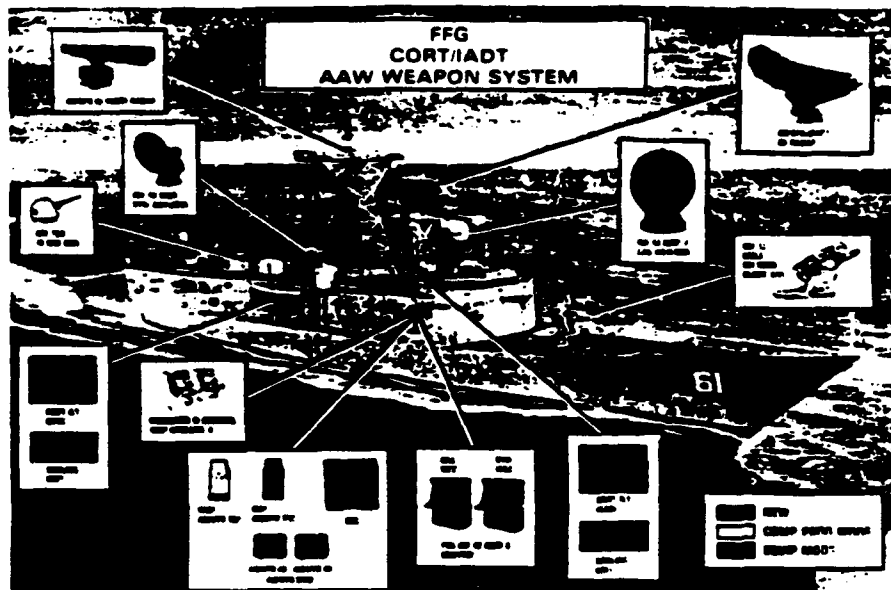
BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: MK 92 FIRE CONTROL SYSTEM (FCS) UPGRADE

PROJECT NUMBER: S0179

PROJECT TITLE: MK 92 FCS UPGRADE

POPULAR NAME: CORT



A. (U) SCHEDULE/BUDGET INFORMATION: (DOLLARS IN THOUSANDS)

SCHEDULE	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
PROGRAM MILESTONES				
ENGINEERING MILESTONES		MID-LIFE CODR		
T&E MILESTONES	DT-IID/ OT-IIB			
CONTRACT MILESTONES				
BUDGET (\$K)	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
MAJOR CONTRACT	3485	1638	1596	CONT.
SUPPORT CONTRACT				
IN-HOUSE SUPPORT	3836	362	345	CONT.
GFE/ OTHER				
TOTAL	7321	2000	1941	CONT.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0604301M Budget Activity: 4
 Program Element Title: MK 92 Fire Control System (FCS) Upgrade
 Project Number: 80179 Project Title: MK 92 FCS Upgrade

B. (U) DESCRIPTION: This program element supports integration and testing of improvements to the FCS MK 92 Mod 2 and the FCS MK 92 Mod 6 Coherent Receiver Transmitter (CORT) upgrade. This program includes system engineering, integration and testing of all components of the FFG 7 class Anti-Ship Missile Defense (ASMD) mid-life upgrade.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Conducted DT-II and OPEVAL testing aboard FFG 61.
- b. (U) Analyzed data from DT-II/OT and initiate correction of any deficiencies noted in testing.
- c. (U) Began re-compile of the FCS MK 92 MOD 6 computer program.
- d. (U) Completed feasibility study of Standard Missile-2 (SM-2) applicability for the FFG's.
- e. (U) Initiated embedded trainer development.

2. (U) FY 1992 PROGRAM:

- a. (U) Develop modifications to correct deficiencies noted in DT/OT in FFG 61.
- b. (U) Investigate Standard Missile-1 Block VI B applicability.
- c. (U) Continue embedded trainer development.
- d. (U) Continue re-compile of FCS MK 92 MOD 6 computer programs.
- e. (U) Develop MK 92 Mod 2/6 tactical improvements, including Guard Gate, Priority Engage and Sector Scan.
- f. (U) Continue development of MK 92 Mod 2 technical improvements, including testing and integration of a heavy duty transmission for Combined Antenna System (CAS) and reduction of high failure rate items.
- g. (U) Support analysis/trade-off studies to coordinate and refine element roles within ship self defense strategy; support development of system interface adaptations as necessary to provide effective ship self defense integration.

3. (U) FY 1993 PLANS:

- a. (U) Continue investigation of SM-2 Block VI B applicability.
- b. (U) Continue embedded trainer development.
- c. (U) Certify the FCS MK 92 MOD 6 computer program.
- d. (U) Continue development of MK 92 Mod 2 tactical improvements.
- e. (U) Continue development of MK 92 Mod 2 technical improvements.
- f. (U) Begin Electro Optic improvements for the Separate Tracking and Illuminating Radar (STIR).
- g. (U) Initiate Low 'E' Continuous Wave Illuminator (CWI) improvement.
- h. (U) Support continuing analysis/trade-off studies and implementation of functional and performance allocations among elements comprising integrated ship self defense systems, including system interface adaptations and preparation/conduct of associate tests and demonstrations.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: COMOPTEVFOR, Norfolk, VA; NAVSHIPWPNSYSENGSTA, Port Hueneme, CA; Pacific Missile Test Center, Point Mugu, CA; Naval Warfare Assessment Center, Seal Beach, CA; Surface Warfare Development Group, Norfolk, VA. CONTRACTORS: PARAMAX Corporation, Great Neck, NY; Johns Hopkins University, Applied Physics Laboratory; Laurel, MD; Vitro Corporation, Silver Spring, MD.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

- 1. (U) Technical changes: Not Applicable.
- 2. (U) Schedule changes: Not Applicable.
- 3. (U) Cost changes: Not Applicable.

FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604301N **BUDGET ACTIVITY: 4**
PROGRAM ELEMENT TITLE: MK 92 FIRE CONTROL SYSTEM (FCS) UPGRADE
PROJECT NUMBER: 80179 **PROJECT TITLE: MK 92 FCS UPGRADE**

F. (U) PROGRAM DOCUMENTATION: TEMP 107-2

G. (U) RELATED ACTIVITIES: Not Applicable.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE
(U) OPN# 175	14,921	13,692	22,964	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) TEST AND EVALUATION: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604303N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AEGIS AREA AIR DEFENSE
PROJECT NUMBER: K1776 PROJECT TITLE: AEGIS WEAPON SYSTEM MODS

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
K1776	AWS MODS	9,520	7,853	7,278	CONT.	CONT.

B. (U) DESCRIPTION: This program provides for modifications to the AEGIS Weapon System MK-7 to counter the threat (Naval Maritime Intelligence Center (NAVMIC) Threat Assessment #012-91 of September 1991). The modifications will be backfitted into CG 47 Class and DDG 51 Class ships already in the fleet.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Conducted engineering development and testing of SPY-1 Electronic Counter Countermeasures (ECCM) improvements and Fire Control System (FCS) Stable Master Oscillator (STAMO).
- b. (U) Developed Fuse Design fix for STANDARD Missile-2.

2. (U) FY 1992 PROGRAM:

- a. (U) Conduct engineering development and testing of SPY-1 ECCM improvements and FCS STAMO.
- b. (U) Conduct engineering development of SPY-1B and Operational Readiness Test System man-machine interface improvements.

3. (U) FY 1993 PLANS:

- a. (U) Conduct first unit checkout of FCS STAMO.
- b. (U) Build SPY-1B/D signal processor ECCM changes and test.
- c. (U) Start development and engineering of various SPY-1B/D upgrades.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN HOUSE: NSWC, Dahlgren, VA; NSWSES, Port Hueneme, CA; and NWS, Concord, CA. CONTRACTORS: General Electric, Morristown, NJ; Raytheon Corporation, Wayland, MA; Motorola Corp., Scottsdale, AZ; and PNC, Minneapolis, MN.

E. (U) RELATED ACTIVITIES: Program Element 0604307N, AEGIS Combat System Engineering; Program Element 0604366N, Standard Missile Improvements.

F. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT					
(U) OPN #181	63,880	46,387	154,317	CONT.	CONT.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604307N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: AEGIS Combat System Engineering

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
K1337	DDG 51 COMB SYS	35,002	40,924	34,882	CONT.	CONT.
K1447	COMB SYS IMPR	17,634	18,262	26,124	CONT.	CONT.
K1937	DDG WFN DEV	38,977	31,585	28,896	30,929	165,476
	TOTAL	91,613	90,771	89,902	CONT.	CONT.

B. (U) DESCRIPTION: The AEGIS Combat System provides immediate and effective capability to counter the current and expected air, surface and sub-surface threats as articulated in Naval Maritime Intelligence Center (NAVMIC) Threat Assessment #012-91 dated September 1991. Since the CG 47 and DDG 51 ships extend into the 21st century, changes in the threat capability and advances in technology such as fiber optics, and distributed architecture local area networks will require corresponding Combat System changes. This program provides the Combat System engineering and selected weapons development necessary for such a continued increase in the capability of the AEGIS Combat System in AEGIS cruisers and destroyers. It will also allow later ships of these classes to take advantage of maturing equipments and weapons systems being developed in other Navy research and development programs. Modifications of AEGIS Weapon System computer programs must be made to integrate these capabilities into the AEGIS Combat System so that battle effectiveness will be retained against the evolving threat.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604307M

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: AEGIS Combat System Engineering

PROJECT NUMBER: K1337

PROJECT TITLE: DDG 51 COMB SYS



POPULAR NAME: DDG C/S ENGINEERING

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	TO COMPLETE	
PROGRAM MILESTONES	DDG 51 SGT 4/91	M/S III		CONT.	
ENGINEERING MILESTONES	B/L 4 PH II SQT 9/91 B/L 5 PH I PDR I 5/91	B/L 5 PH I PDR II 11/91 B/L 5 PH I CDR 3/92 B/L 5 PH II PDR 5/92	B/L 5 PH I SQT 8/93 B/L 5 PH II CONT. CDR 12/92 B/L 5 PH III SDR 11/92 B/L 5 PH III PDR 6/93		
TEE MILESTONES		DT-III A 10/91 OT-III A 1-2/92 SPY-1D DT-II B 10/91 SPY-1D OT-II B 1-2/92		CONT.	
CONTRACT MILESTONES	B/L 5 PH I Cont. Award 8/91	None	B/L 5 PH II Cont. Award 11/92		
BUDGET (\$K)	FY 1991	FY 1992	FY 1993	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	29,030	34,505	29,777	CONT.	CONT.
SUPPORT CONTRACT	144	139	140	CONT.	CONT.
IN-HOUSE SUPPORT	5,828	6,280	4,965	CONT.	CONT.
GFE/ OTHER	0	0	0	CONT.	CONT.
TOTAL	35,002	40,924	34,882	CONT.	CONT.

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FY 1993 ROT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604307N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: AEGIS Combat System Engineering

PROJECT NUMBER: K1337

PROJECT TITLE: DDG 51 COMB SYS

B. (U) DESCRIPTION: This project provides for combat system design, engineering, integration and testing for DDG 51 class ships. The Combat System is derived from the CG 47 Baseline developed under Project K1447, the major difference being the introduction of new computers and displays plus new elements developed under Project K1937. Approved improvements/modifications to the Destroyer Combat System to meet the threat and to capture advances in technology will be integrated into the Combat System as baselines under this project. The Navy Plan is to upgrade AEGIS ships in blocks. The first block of ships includes DDG 51 through DDG 67 (FY 1985 through FY 91) which will be equipped with the Baseline 4 Combat System. The FY 92 through FY 94 ships will receive the Baseline 5 Combat System. Approved Baseline 5 ship characteristics changes include Joint Tactical Information Distribution System (JTIDS)/Command and Control Processor (C²P), Tactical Data Information Link (TADIL J), Combat Direction Finding (DF), Tactical Data Information Exchange System (TADIX B), AN/SLQ-32(V)3 Active Electronic Countermeasures (ECM) and AEGIS Extended Range (ER) Missile. Baseline 5 will be developed in three steps (phases): Phase I integrates AEGIS ER and supports the missile Initial Operational Capability (IOC); Phase II integrates all planned upgrades except for JTIDS so they can be backfitted into Baseline 4 ships (the computer programs can operate in Baseline 4 ships whether any or all of the Baseline 5 new systems are installed); Phase III integrates JTIDS into the AEGIS Combat System. Beginning with the last FY 94 ship, further approved modifications planned as Baseline 6 upgrades include embarked helicopters, Evolved SEASPARROW Missile, and Fiber Optics as applied to Data Multiplexing System (DMS) and Interior Voice Communications System (IVCS). It also includes the addition of the Track Initiation Processor (TIP) capability in the AN/SPY-1D radar system. The AEGIS Combat System will continue to be upgraded at approved intervals. Beginning in FY 91, Projects K1337 and K1447 share support of the same Combat System engineering efforts for the DDG 51 Program.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: (Identical to Project K1447)
 - a. (U) Transferred ship custody of ARLEIGH BURKE (DDG 51).
 - b. (U) Completed computer program coding, debugging and unit testing and commenced system testing of AN/SPS-67(V)3, Anti-Submarine Warfare (ASW) Onboard Trainer, TOMAHAWK Weapon System (TWS) Trainer and AEGIS Display System upgrades into AEGIS Combat System (Baseline 4 Phase II) at the Combat System Engineering Development (CSED) Site.
 - c. (U) Conducted Baseline 4 Phase II demonstration and System Qualification Test (SQT).
 - d. (U) Completed system definition, conducted Preliminary Design Review (PDR) I, and developed design specifications to integrate AEGIS ER into the AEGIS Weapon System (Baseline 5 Phase I).
 - e. (U) Performed system definition for the integration of TADIX B, AN/SLQ-32(V)3 and Combat DF into the AEGIS Combat System (Baseline 5 Phase II).
2. (U) FY 1992 PROGRAM: (Identical to Project K1447.)
 - a. (U) Conduct SPY-1D Technical and Operational Evaluation (TECHEVAL/OPEVAL) (DT/OT-IIE) in ARLEIGH BURKE.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604307N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: AEGIS Combat System Engineering

PROJECT NUMBER: K1337

PROJECT TITLE: DDG 51 COMB SYS

b. (U) Perform element test, evaluation, demonstration and qualification of OJ663 console variant of the ADS computer program in Baseline 4 Phase II Ships. Conduct demo and Element Qualification Testing (EQT).

c. (U) Conduct PDR II and Critical Design Review (CDR); complete design specifications, and commence computer program coding, debugging and testing for AEGIS ER integration into the AEGIS Weapon System (Baseline 5 Phase I) at the CSED Site.

d. (U) Commence Design specifications to integrate Baseline 5 Phase II (less JTIDS) into the Combat System. Conduct PDR.

e. (U) Commence system definition to integrate JTIDS into the AEGIS Combat System (Baseline 5 Phase III).

f. (U) Commence system definition to integrate Evolved SEASPARROW Missile, fiber optics DNS and IVCS, and TIP capability in the AN/SPY-1D radar system into the AEGIS Combat System (Baseline 6) at the CSED Site.

3. (U) FY 1993 PLANS: (Identical to Project K1447.)

a. (U) Complete computer program coding, debugging and testing of AEGIS ER integration into the AEGIS Weapon System (Baseline 5 Phase I).

b. (U) Conduct system demonstration of AEGIS ER computer programs for integration into the AEGIS Weapon System at the CSED Site.

c. (U) Complete design specifications and conduct a Critical Design Review of Baseline 5 Phase II (less JTIDS). Commence computer program coding, debugging and testing at CSEDS to integrate into the AEGIS Combat System.

d. (U) Complete system definition, conduct SDR and PDR; commence design specifications for Baseline 5 Phase III (with JTIDS).

e. (U) Perform system definition to integrate Baseline 6 upgrades into the AEGIS Combat System.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NOSC, San Diego, CA; NSWC, Dahlgren, VA; NWS, Concord, CA; NWAC, Corona, CA; PMTC, Ft. Mugu, CA; and NRL, Washington, D.C. CONTRACTORS: General Electric, Moorestown, NJ, and Syracuse, NY; Raytheon Corporation, Wayland, MA; Johns Hopkins University, APL, Laurel, MD; and VITRO Corporation, Silver Spring, MD.

E. (U) COMPARISON WITH FY 1992/93 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: CNO's decision at the December 1991 CDM review of the Destroyer Variant (DDV) Study changed Combat System Baseline 6 configuration to include two embarked helicopters, Evolved SEASPARROW Missile, Fiber Optics DNS and IVCS, and TIP capability in the AN/SPY-1D radar system. Baseline 6 is scheduled for the last FY 94 ship. Development of SPY-1 radar upgrades (initially planned for an FY 95 ship) will continue through land based demos in FY 94 and 95. At sea testing and introduction in future ships is under evaluation.

2. (U) SCHEDULE CHANGES: (1) DDG 51 Ship Custody Transfer (SCT) slipped two months from 2/91 to 4/91, causing: (a) DT/OT IIIA for DDG 51 to slip from 7/91 to 10/91 and 8/91 to 1/92, respectively; (b) DT/OT IIB for the radar to slip from 7/91 to 10/91 and 8/91 to 1/92, respectively. (2) Baseline 4 Phase II EQT slipped from 7/91 to 9/91 as a result of application of resources to Desert Storm. (3) The Baseline 5 Reviews have been modified to reflect the actual schedules negotiated upon contract award. While dates have been adjusted slightly from last year, they still support the FY 92 ship construction program. In the award of the contract, three phases were defined. The first phase is available late FY 93 to support AEGIS ER Initial

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604307N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: AEGIS Combat System Engineering

PROJECT NUMBER: K1337

PROJECT TITLE: DDG 51 COMB SYS

Operational Capability (IOC). The second phase incorporates all new systems and capabilities planned for the FY 92 ships except for JTIDS and is available in late FY 94 for installation in all Baseline 4 ships. The third phase adds JTIDS and is available to support the FY 92 ships. The PDRs shown in the prior year schedule did not reflect this plan, so a direct comparison is not relevant.

3. (U) COST CHANGES: Not Applicable.

F. (U) PROGRAM DOCUMENTATION:

TLR, Rev 1, Chg 1	8/85
NDCP 1337, Rev 1, Chg 1	9/86
MTPS-30-8511A	9/87
Acq Plan 166-86, Rev B, Chg 7	12/91
TEMP 801, Rev 6	1/92

G. (U) RELATED ACTIVITIES: PE 0604355N, Vertical Launch ASROC; PE 0604303N, AEGIS Area Air Defense; PE 0604366N, Standard Missile Improvements; PE 0603755N, Ship Self Defense; PE 0603318N, Advanced Surface-to-Air Missile.

H. (U) OTHER APPROPRIATION FUNDS (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT:					
(U) SCN	3,145,078	4,335,305	3,479,486	CONT.	CONT.
(U) QUANTITY	(4)	(5)	(4)		
(U) OPN #181	63,880	46,387	154,317	CONT.	CONT.
(U) O&M,N	168,350	155,324	164,261	CONT.	CONT.
(U) MILCON	5,400	0	0	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) TEST AND EVALUATION: This information is included in the FY 1993 Congressional Data Sheets.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604307N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: AEGIS Combat System Engineering

PROJECT NUMBER: K1447

PROJECT TITLE: Combat System Improvement

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE CONT.	TOTAL PROGRAM CONT.
K1447	C/S IMP	17,634	18,262	26,124		

B. (U) DESCRIPTION: This project provides AEGIS Cruiser and Destroyer Combat System upgrades to integrate new equipments and systems to maintain pace with the threat and to capture advances in technology such as fiber optics and distributed architecture. The ships are upgraded in blocks and the Combat System in baselines. Baseline 2 (CG 52-58) consisted of the Vertical Launching System, TOMAHAWK Weapon System (TWS), and Anti-Submarine Warfare (ASW) upgrades. Baseline 3 (CG 59-64) included the AN/SPY-1B radar and AN/UYQ-21 consoles. Baseline 4 (CG 65-73) integrated the AN/UYK-43/44 computers with superset computer programs developed for the DDG 51. Baseline 4 is the base Combat System for DDG 51-67. Baseline 5 is targeted for FY 92 ships and includes the Joint Tactical Information Distribution System (JTIDS)/Command and Control Processor (C/P), TADIL J, Combat Direction Finding (DF), Tactical Data Information Exchange System (TADIX B), AN/SLQ-32(V)3 Active Electronic Countermeasures (ECM) and AEGIS Extended Range (ER) Missile. Baseline 5 will be developed in three steps (phases): Phase I integrates AEGIS ER and supports the missile Initial Operational Capability (IOC); Phase II integrates all planned upgrades except for JTIDS so they can be backfitted into Baseline 4 ships (the computer programs can operate in Baseline 4 ships whether any or all of the Baseline 5 new systems are installed); Phase III integrates JTIDS into the AEGIS Combat System. Baseline 6 is planned for the last ship in FY 94 and will include embarked helicopters, Evolved SEASPARROW Missile, and Fiber Optics as applied to Data Multiplexing System (DMS) and Interior Voice Communications System (IVCS). It also includes the addition of the Track Initiation Processor (TIP) capability in the AN/SPY-1D radar system. The AEGIS Combat System will continue to be upgraded at approved intervals. Beginning in FY 91, Projects K1337 and K1447 share support of the same Combat System engineering efforts for the DDG 51 Program.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: (Identical to project K1337)

- (U) Completed Ship Custody Transfer of CG 65 and DDG 51.
- (U) Completed computer program coding, debugging and unit testing and commenced system testing of AN/SPS-67(V)3, Anti-Submarine Warfare (ASW) Onboard Trainer, TOMAHAWK Weapon System (TWS) Trainer, AEGIS Display System upgrades, AN/SPS-49(V)7, and MK 86 air capable gun mode into AEGIS Combat System (Baseline 4 Phase II) at the Combat System Engineering Development (CSED) Site.
- (U) Conducted Baseline 4 Phase II demonstration and System Qualification Tests (SQT).
- (U) Completed system definition, conducted Preliminary Design Review (PDR) I, and developed design specifications to integrate AEGIS ER into the AEGIS Weapon System (Baseline 5 Phase I).
- (U) Performed system definition for the integration of TADIX B, SLQ-32(V)3 and Combat DF into the AEGIS Combat System (Baseline 5 Phase II).

2. (U) FY 1992 PROGRAM: (Identical to Project K1337.)

- (U) Conduct SPY-1D Technical and Operational Evaluation (TECHEVAL/OPEVAL) (DT/OT-IIE) in ARLEIGH BURKE.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604307N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: AEGIS Combat System Engineering

PROJECT NUMBER: K1447

PROJECT TITLE: Combat System Engineering

b. (U) Perform element test, evaluation, demonstration and qualification of QJ663 console variant of the ADS computer program in Baseline 4 Phase II Ships. Conduct demo and Element Qualification Testing (EQT).

c. (U) Conduct PDR II and Critical Design Review (CDR); complete design specifications, and commence computer program coding, debugging and testing for AEGIS ER integration into the AEGIS Weapon System (Baseline 5 Phase I) at the CSED Site.

d. (U) Commence Design specifications to integrate Baseline 5 Phase II (less JTIDS) into the Combat System. Conduct PDR.

e. (U) Commence system definition to integrate JTIDS into the AEGIS Combat System (Baseline 5 Phase III).

f. (U) Commence system definition to integrate Evolved SEASPARROW Missile, fiber optics DMS and IVCS, and TIP capability in the AN/SPY-1D radar system into the AEGIS Combat System (Baseline 6) at the CSED Site.

3. (U) FY 1993 PLANS: (Identical to Project K1337.)

a. (U) Complete computer program coding, debugging and testing of AEGIS ER integration into the AEGIS Weapon System (Baseline 5 Phase I).

b. (U) Conduct system demonstration of AEGIS ER computer programs for integration into the AEGIS Weapon System at the CSED Site.

c. (U) Complete design specifications and conduct a Critical Design Review of Baseline 5 Phase II (less JTIDS). Commence computer program coding, debugging and testing at CSEDs for integration into AEGIS Combat System.

d. (U) Complete system definition, conduct SDR and PDR, and commence design specifications for Baseline 5 Phase III (with JTIDS).

e. (U) Perform system definition to integrate Baseline 6 upgrades onto the AEGIS Combat System.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NSWC, Dahlgren, VA; NWAC, Corona, CA; CONTRACTORS: General Electric, Moorestown, NJ, and Syracuse, NY; VITRO Corporation, Silver Spring, MD; and Johns Hopkins University, APL, Laurel, MD.

E. (U) COMPARISON WITH FY 1992/93 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: CNO's decision at the December 1991 CDM review of the Destroyer Variant (DDV) Study changed Combat System Baseline 6 configuration to include two embarked helicopters, Evolved SEASPARROW Missile, Fiber Optics DMS and IVCS, and TIP capability in the AN/SPY-1D radar system. Baseline 6 is scheduled for the last FY 94 ship. Development of SPY-1 radar upgrades (initially planned for an FY 95 ship) will continue through land based demos in FY 94 and 95. At sea testing and introduction in future ships is under evaluation.

2. (U) SCHEDULE CHANGES: (1) DDG 51 Ship Custody Transfer (SCT) slipped two months from 2/91 to 4/91, causing: (a) DT/OT IIIA for DDG 51 to slip from 7/91 to 10/91 and 8/91 to 1/92, respectively; (b) DT/OT IIE for the radar to slip from 7/91 to 10/91 and 8/91 to 1/92, respectively. (2) Baseline 4 Phase II SGT slipped from 7/91 to 9/91 as a result of application of resources to Desert Storm. (3) The Baseline 5 Reviews have been modified to reflect the actual schedules negotiated upon contract award. While dates have been adjusted slightly from last year, they still support the FY 92 ship construction program. In the award of the contract, three phases were defined. The first phase is available late FY 93 to support AEGIS ER Initial Operational Capability (IOC). The second phase incorporates all new systems and capabilities planned for the FY 92 ships except for JTIDS and is

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604307N BUDGET ACTIVITY: 4
 PROGRAM ELEMENT TITLE: AEGIS Combat System Engineering
 PROJECT NUMBER: K1447 PROJECT TITLE: Combat System Engineering

available in late FY 94 for installation in all Baseline 4 ships. The third phase adds JTIDS and is available to support the FY 92 ships. The PDRs shown in the prior year schedule did not reflect this plan, so a direct comparison is not relevant. See schedule in K1337.

3. (U) COST CHANGES: FY 1993 funding reduced \$1,096K for pricing adjustments.

F. (U) PROGRAM DOCUMENTATION:

DCP-134	3/78 (except waiver ltr)
TLR, Rev 1, Chg 1	12/82
Ship ILS Plan 127-DD, Rev 2, Chg 7	9/87
NTP-30-7707B	2/88
TEMP 100, Rev 3	1/89
Acq Plan 166-86, Rev B, Chg 7	12/91

G. (U) RELATED ACTIVITIES: PE 0604355N, Vertical Launch ASROC; PE 0604303N, AEGIS Area Air Defense; PE 0604366N, Standard Missile Improvements; PE 0603755N, Ship Self Defense; PE 0603318N, Advanced Surface-to-Air Missile.

H. (U) OTHER APPROPRIATION FUNDS (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT:					
(U) SCN	3,145,072	4,335,305	3,479,486	CONT.	CONT.
(U) QUANTITY	(4)	(5)	(4)		
(U) OPN #181	63,880	46,387	154,317	CONT.	CONT.
(U) O&M,N	168,350	155,324	168,261	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE:

1. (U) CG 65 delivered.	Nov 1990
2. (U) DDG 51 delivered	Apr 1991
3. (U) Conducted Baseline 4 Phase II SQT.	Sep 1991
4. (U) Baseline 5 SDR/PDR	Nov 1992/Jun 1993
5. (U) Baseline 5 Phase I SQT	Aug 1993

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PROGRAM ELEMENT: 0604307N

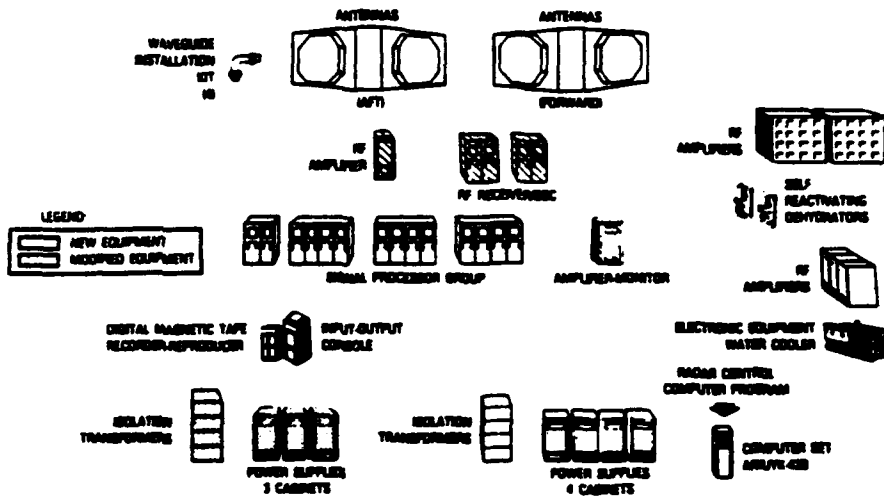
BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: AEGIS Combat System Engineering

PROJECT NUMBER: K1937

PROJECT TITLE: DDG Weapons Development

RADAR SYSTEM AN/SPY-1D EDM-4B EQUIPMENT CONFIGURATION



POPULAR NAME: SPY-1 RADAR UPGRADES

A. (U) SCHEDULE/BUDGET INFORMATION: (dollars in Thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	TO COMPLETE	
PROGRAM	DDG 51 SCT	SPY-1D M/S III	None	None	
MILESTONES	4/91				
ENGINEERING	None	EDM SDR 12/91	EDM CDR	Demo	
MILESTONES		EDM PDR 4/92	10/92	11/94	
TEE		SPY-1D DT-III			
MILESTONES		10/91			
		SPY-1D OT-III			
		1-2/92	None	None	
CONTRACT	Contract Award				
MILESTONES	2/91	None	None	None	
BUDGET (\$K)	FY 1991	FY 1992	FY 1993	TO COMPLETE	TOTAL PROGRAM
MAJOR CONTRACT	36,060	28,500	26,204	28,200	151,164
SUPPORT CONTRACT	0	0	0	0	0
IN-HOUSE SUPPORT	2,917	3,085	2,692	2,729	14,312
GFE/OTHER	0	0	0	0	0
TOTAL	38,977	31,585	28,896	30,929	165,476

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604307N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: AEGIS Combat System Engineering

PROJECT NUMBER: K1937

PROJECT TITLE: DDG Weapons Development

B. (U) DESCRIPTION: This program is required to develop selected systems and subsystems for the ARLEIGH BURKE (DDG 51) class ships. This project funds development of equipment for the AEGIS Combat System, as opposed to the costs of integrating elements into the Combat System which is funded in Projects K1337 and K1447. Current funding provides for development of an upgrade to the current AN/SPY-1D radar to enhance its capability against seaskimming targets in increasingly more severe electronic countermeasures and in near-land clutter environments. The changes are in the transmitter, signal processor, and radar control computer program.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Began system definition. Conducted detailed performance requirements analysis and definition and allocated the performance requirements to the appropriate major units of the AN/SPY-1B/D radar, e.g., Signal Processor and Transmitter.

b. (U) Began development of design specifications to determine equipment and firmware requirements.

c. (U) Began detailed radar frame, module, subassembly and cabinet design and development.

d. (U) Began equipment procurement fabrication and assembly.

2. (U) FY 1992 PROGRAM:

a. (U) Continue systems engineering to validate performance requirements analyses and definition.

b. (U) Conduct a System Design Review (SDR) and a Preliminary Design Review (PDR) for radar upgrades.

c. (U) Continue development of design specifications to determine equipment and firmware requirements.

d. (U) Continue detailed radar frame, module, subassembly and cabinet design and development.

e. (U) Continue equipment procurement fabrication and assembly.

3. (U) FY 1993 PLANS:

a. (U) Complete design specifications and conduct a Critical Design Review (CDR).

b. (U) Continue EDM-4B system engineering and commence generation of computer program code; debug and test computer program modifications.

c. (U) Continue equipment procurement fabrication and assembly.

d. (U) Conduct element unit testing of the engineering development model.

4. (U) PROGRAM TO COMPLETION:

a. (U) Continue computer program code, debug and test.

b. (U) Complete EDM fabrication; and complete element integration and testing.

c. (U) Install and perform system level integration at the Combat System Engineering Development (CSED) site.

d. (U) Complete system and perform demonstration at CSED.

D. (U) WORK PERFORMED BY: IN-HOUSE: NSWC, Dahlgren, VA; and NSWSES, Port Hueneme, CA. CONTRACTORS: General Electric, Moorestown, NJ; and Johns Hopkins University, APL, Laurel, MD.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604307N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AEGIS Combat System Engineering
PROJECT NUMBER: K1937 PROJECT TITLE: DDG Weapons Development

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: Not Applicable.
2. (U) SCHEDULE CHANGES: This corrects an administrative error in the FY 1992/93 RDT&E Navy Descriptive Summary for Project S1937 in the Engineering Milestones. The Design Review Schedule has been modified slightly from last year to reflect actual schedules negotiated upon contract award. The combined SDR/PDR scheduled for 10/91 will be held as separate events with SDR in 12/91 and PDR in 4/92.
3. (U) COST CHANGES: Funding reduced \$1,221 in FY 1993 as follows: \$667 for inflation assumption and \$554 resulting from a Department Decision relating to contract management.

F. (U) PROGRAM DOCUMENTATION:

TLR, Rev 1, Chg 1	8/85
NDCP 1337, Rev 1, Chg 1	9/86
NTPS-30-8511A	9/87
PMP 88-03	10/88
PMP 89-01	10/89
Acq Plan, PMS400G-91-01	12/91
TEMP 801, Rev 6	1/92

G. (U) RELATED ACTIVITIES: PE 0604303N, AEGIS Area Air Defense

H. (U) OTHER APPROPRIATION FUNDS (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT:					
(U) SCN	3,145,078	4,335,305	3,479,486	CONT.	CONT
(U) QUANTITY	(4)	(5)	(4)		

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) TEST AND EVALUATION: Included in FY 1993 Congressional Data Sheets.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604314N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: ADVANCED MEDIUM RANGE AIR-TO-AIR MISSILE
PROJECT NUMBER: E0981 PROJECT TITLE: AMRAAM

B. (U) DESCRIPTION: This joint Navy/Air Force program is structured in response to the Joint Service Operational Requirement and Mission Element Need statement to develop an air superiority air-to-air missile as a SPARROW follow-on with significant improvements in operational utility and combat effectiveness. This program supports the integration of the AMRAAM into Navy aircraft with analysis of Navy unique applications, simulation capability development, aircraft missile integration tasks, pre-planned product improvement (P3I) efforts, and procurement of hardware to support Navy test and evaluation tasks.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:
 - a. (U) Completed operational testing (OT-IIIA).
 - b. (U) Initiated operational testing (OT-IIIB).
 - c. (U) Continued refinement of missile performance (e.g. Electronic Counter Counter Measures (ECCM)).
 - d. (U) Continued participation in AMRAAM P3I Phase I program with emphasis on Navy unique requirements and aircraft integration compatibility.
2. (U) FY 1992 Program:
 - a. (U) Continue refinement of missile/aircraft ECCM system performance.
 - b. (U) Complete operational testing (OT-IIIB).
 - c. (U) Continue participation in AMRAAM P3I Phase I program including PDR with emphasis on Navy unique requirements and aircraft integration compatibility.
 - d. (U) Participate in P3I Phase 2 program definition.
3. (U) FY 1993 Plans:
 - a. (U) Continue refinement of missile/aircraft ECCM system performance.
 - b. (U) Continue participation in AMRAAM P3I Phase I program including CDR with emphasis on Navy unique requirements and aircraft integration compatibility.
 - c. (U) Initiate participation in P3I Phase I test program.
 - d. (U) Participate in P3I Phase 2 program planning and implementation.
4. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NWC, China Lake, CA; PMTC, Point Mugu, CA; Air Force Development Test Center, Advanced Medium Range Air-to-Air Missile Joint System Program Office, Eglin Air Force Base, FL. CONTRACTORS: Hughes Aircraft Company, Canoga Park, CA; Raytheon Company, Bedford, MA.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0604314N Budget Activity: 4
Program Element Title: ADVANCED MEDIUM RANGE AIR-TO-AIR MISSILE
Project Number: E0981 Project Title: AMRAAM

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) Technical Changes: Not Applicable
2. (U) Schedule Changes: Not Applicable
3. (U) Cost Changes: None

F. (U) PROGRAM DOCUMENTATION:

JSOR	9/78	ILSP	2/91
MENS	11/78	DCP	3/91
SORD	1/90	TEMP	11/90

G. (U) RELATED ACTIVITIES:

(U) AMRAAM integration with the following programs:

Program Element 0207130F, F-15
Program Element 0207133F, F-16
Program Element 0603230F, 0604239F, F-22
Program Element 0205667N, F-14
Program Element 0204136N, F-18
Program Element 0207163F, AMRAAM P31

(U) There is no unnecessary duplication of efforts within the Navy, Air Force, or Department of Defense.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT					
WPN #6	286,351	205,392	137,478	Cont	Cont
(U) RDT&E, AF	17,953	30,330	36,854	Cont	Cont

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: No cooperative agreements with Foreign Governments exist at this time for a P31 version of the AMRAAM. Germany has withdrawn from the Memorandum of Understanding (MOU) for a Family of Advanced Air-to-Air Missile Systems between the Federal Republic of Germany (GE), the United Kingdom (UK), and the United States. The U.S. does not favor continuing the MOU with the UK because the Advanced Short Range Air-to-Air Missile has not been developed. The UK will procure AMRAAM through FMS. Germany has requested a co-production arrangement which is currently under review at OSD. Germany will buy its initial inventory of weapons through FMS. The governments of Turkey and South Korea have signed agreements to procure AMRAAM through FMS.

J. (U) TEST AND EVALUATION: This information is included in the FY 1993 Congressional Data Sheets.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

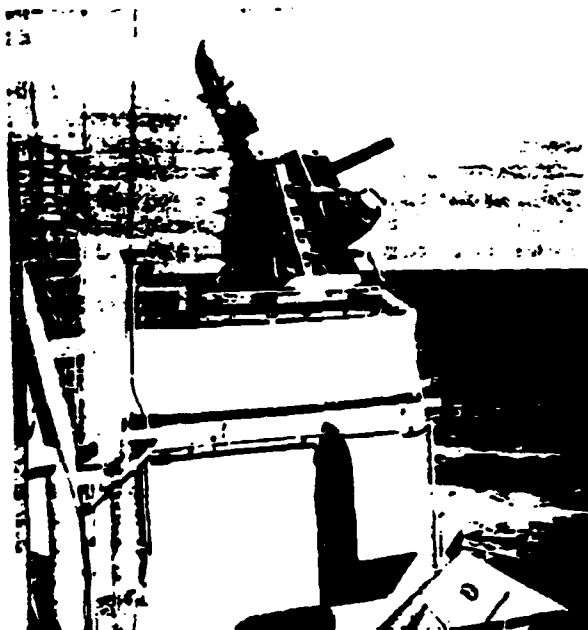
PROGRAM ELEMENT: 0604358N

BUDGET ACTIVITY: 4

PROGRAM TITLE: Close-In Weapon System (PHALANX)

PROJECT NUMBER: S0172

PROJECT TITLE: Close-In Weapon System (PHALANX)



POPULAR NAME: PHALANX

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	TO COMPLETE
PROGRAM		I (BLK II)	II (BLK II)	III (BLK II)
MILESTONES		SEP 92	AUG 93	4TH QTR/98
ENGINEERING BLK I BL3			BLK I RU	BLK II CDR
MILESTONES PDR			PDR	4TH QTR/94
T&E				BLK I BL3
MILESTONES				FOT&E 1Q/95
				BLK II DT/OT
				2Q/98
CONTRACT		BLK I RU EMD	BLK II EMD	BLK II PROD.
MILESTONES		FY 92-95	FY 93-97	4TH QTR/98
BUDGET (\$K)				PROGRAM TOTAL
	FY 1991	FY 1992	FY 1993	TO COMPLETE
MAJOR				
CONTRACT	N/A	4,363	3,117	Continuing Program
SUPPORT				
CONTRACT	N/A	N/A	N/A	N/A
IN-HOUSE				
SUPPORT	6,335	4,779	5,896	Continuing Program
GFE/				
OTHER	N/A	N/A	N/A	Continuing Program
Total	6,335	9,142	9,013	Continuing Program

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604358N

BUDGET ACTIVITY: 4

PROGRAM TITLE: Close-In Weapon System (PHALANX)

PROJECT NUMBER: S0172

PROJECT TITLE: Close-In Weapon System (PHALANX)

B. (U) DESCRIPTION: The PHALANX Close-In Weapon System (CIWS) is an automatic, fast-reaction, computer-controlled radar and gun system. It functions as the last segment in the Navy's "defense-in-depth" concept. Its mission is to detect, engage, and destroy hostile anti-ship missiles that have penetrated the ship primary defense systems. It is intended for simple installation on a large variety of Navy ships. The program requirements are contained in the CIWS Block I (MK 15 MODS 11-14) TEMP 142-1 (Rev 2). The system consists of a search and track radar subsystem, a six-barrel Gatling gun, and a control system. When operating automatically, the CIWS' primary mode of operation, the system continually searches in azimuth. It automatically detects, evaluates, tracks, and engages threats and then returns to search mode ready for another target. The initial CIWS version, Block 0, has been approved for service use (ASU) and is in the fleet. CIWS Block I, Baseline 0, provides increased performance in search elevation coverage, increased velocity coverage, a larger magazine, augmented reliability, built-in test equipment (BITE), and improvements to system operability test (SOT) and fault isolation test (FIT) programs. Block I received ALP in FY 85 and IOC occurred 10/88. CIWS Block I, Baseline 1, adds a pneumatic gun drive, enabling the gun to fire 4,500 rpm, and increased search sensitivity. In FY 88 Block I received Approval for Limited Production for FY 88 and FY 89 procurements. In FY 90 Block I received Approval for Full Rate Production. Block I Radar Upgrade is defined as a performance upgrade to support the requirement of the Ship Self Defense Program. Block I RU will be refielded as a part of Baseline 3. Block II sensor changes will build off the Block I RU effort.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:

a. (U) Completed PHALANX Surface Mode Concept Study, FOXROT Study, draft Radar Specification for Block II, draft Electro-Optical subsystem specification, and 20mm smoke and flash data reduction.

b. (U) Defined performance requirements for Enhanced Lethality Cartridge and gun subsystem performance requirements for next generation PHALANX.

c. (U) Updated Threat Guide and conducted 20-30mm penetrator tests against live warheads and missile components.

d. Block I Baseline 1 USN 1 OP program was successfully tested at NWC/China Lake, and onboard USCGC RUSH and USS ANTIETAM.

2. (U) FY 1992 Program:

a. (U) Determine useful life of M61A1 gun barrels in PHALANX applications.

b. (U) Begin Engineering Manufacturing Development (EMD) for Block I Radar Upgrade.

c. (U) Conduct 30mm smoke and flash tests, reduce data and determine effects of smoke and flash on Electro-Optics for PHALANX applications.

d. (U) Conduct radar concept Exploration Study for PHALANX.

e. (U) Evaluate projectile candidates for enhanced Lethality Cartridge.

f. (U) Support analysis/trade-off studies to coordinate and refine element roles within ship self defense strategy; support development of system interface adaptations as necessary to provide effective ship self defense integration.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604358N

BUDGET ACTIVITY: 4

PROGRAM TITLE: Close-In Weapon System (PHALANX)

PROJECT NUMBER: 80172

PROJECT TITLE: Close-In Weapon System (PHALANX)

3. (U) FY 1993 Plans:

a. (U) Develop projectile concepts that have the potential to defeat advanced ASM threats and conduct penetration tests necessary to evaluate the ability of projectile concepts to defeat advanced ASM threats.

b. (U) Continue Block I Radar Upgrade program.

c. (U) Begin EMD for Block II.

d. (U) Develop specifications for Combat System Interface, Block IP (Performance) system, and advanced CIWS test bed.

e. (U) Test Block I Baseline 0 and Block I Baseline 1 versions of the OP programs incorporating new multiple weapon control logic.

f. (U) Support continuing analysis/trade-off studies and implementation of functional and performance allocations among elements comprising integrated ship self defense systems, including system interface adaptations and preparation/conduct of associated tests and demonstrations.

4. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSWC Dahlgren, VA; NAVORDSTA, Louisville, KY. CONTRACTORS: General Dynamics, Pomona, CA; General Electric, Pittsfield, MA.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: As a result of the Navy's ship self defense strategy reassessment, future baseline upgrade requirements are to be further defined. As a part of the Ship Self Defense Strategy, the RU has been broken out and redefined to provide needed performance across the Self Defense System.

2. (U) SCHEDULE CHANGES: Program Milestone I for Block II slipped to FY 1992 while the Navy completed a reassessment of its ship self defense strategy. Therefore, Program Milestone II and Block II EMD have slipped to FY 1993. Block II CDR has slipped to FY 1994.

3. (U) COST CHANGES: The decrease in FY 1993 of \$16.9M is a result of Department adjustment due to the ship self-defense strategy reassessment.

F. (U) PROGRAM DOCUMENTATION: CIWS Block I TEMP 142-1 (Rev 2) 8/89

G. (U) RELATED ACTIVITIES: Program Element 0603755N (Ship Self Defense)

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

(U) PROCUREMENT	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
WPN (#41)	46,355	506	0	Continuing	Continuing
Quantity	11	0	0		
SCN (Various)	49,782	62,208	31,074	Continuing	Continuing
Quantity	10	12	6		
WPN MODS (#45)	59,157	56,649	58,527	Continuing	Continuing

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) TEST AND EVALUATION: This information is contained in the FY 1993 Congressional Data Sheet.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604361N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: NATO SEASPARROW

PROJECT NUMBER: S0173 PROJECT TITLE: NATO SEASPARROW

A. (U) RESOURCES (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0173	NATO SEASPARROW	5,743	6,194	6,299	11,102	137,526

B. (U) Description: This program integrates multiple weapon and sensor systems through the MK-23 Target Acquisition System (TAS) to improve acquisition and reaction time for AN/SWY-1 and SWY-2 Self Defense Surface Missile Systems (SDSMS). SWY-1 consists of TAS and MK-57 NATO SEASPARROW (NSSMS), and SWY-2 is TAS and MK-31 Rolling Airframe Missile (RAM) integrated with AN/SLQ-32 ESM system. This occurs through improved sensor correlation/association and Threat Evaluation Weapon Assignment (TEWA) algorithms and implements approved tactical doctrine in system software. Corrects SDSMS RIM-7P OPEVAL deficiencies. Updates SDSMS software to match evolution of shipboard Advanced Combat Direction System (ACDS). Consolidates SDSMS software products into one common TAS computer program to support all ship classes and system variants. Studies kinematic improvement of the SEASPARROW missile as a cooperative NATO SEASPARROW Consortium initiative.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- (U) Commenced Land Based testing of SWY-2 TAS/RAM/SLQ-32 operational computer program (OCP).
- (U) Commenced RIM-7P OPEVAL deficiency correction program.
- (U) Commenced study of kinematic performance improvement of Evolved SEASPARROW missile (ESSM).

2. (U) FY 1992 PROGRAM:

- (U) Deliver TAS integration OCP for SDSMS SWY-2 for the fleet introduction of RAM in LHA-5.
- (U) Commenced development of common TAS integration OCP for both SWY-1 and 2.
- (U) Complete RIM-7P OPEVAL deficiency correction program.
- (U) Continue study of kinematic performance of ESSM.
- (U) Support analysis/trade-off studies to coordinate and refine element roles within ship self defense strategy; support development of system interface adaptations as necessary to provide effective ship self defense integration.

3. (U) FY 1993 PLANS:

- (U) Deliver common TAS Integration OCP for SDSMS SWY-1 for CV/CVN, DD-963, AOR and AOE classes and the Self Defense Test Ship (SDTS) coincident with RIM-7P POT&E.
- (U) Correct deficiencies identified during at-sea testing of SWY-2 TAS OCP in LHA-5.
- (U) Commence development of common TAS integration OCP for SDSMS in LHD-5 class.
- (U) Support continuing analysis/trade-off studies and implementation of functional and performance allocations among elements comprising integrated ship self defense systems, including system interface adaptations and preparation/conduct of associated tests and demonstrations.

4. (U) PROGRAM TO COMPLETION: Date of completion - 1995.

- (U) Complete common SDSMS integration program with at-sea testing in SDTS coincident with RIM-7R OPEVAL and RAM POT&E.

D. (U) WORK PERFORMED BY: IN-HOUSE: NSWSES, Port Hueneme, CA CONTRACTORS: Hughes Aircraft Company, Fullerton, CA; Raytheon Company, Wayland, MA

E. (U) RELATED ACTIVITIES: PE 0603609N, Conventional Munitions; PE 0604369N, 5-inch Rolling Airframe Missile; P.E. 0604608N, Surface Electro-Optic Systems.

F. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: A total of thirteen nations currently participate in the cooperative support/coproduction MOU for the NSSMS originally signed in December 1977.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604363N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: TRIDENT II

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
J0951	TRIDENT II MISSILE	68,151	52,253	64,940	Cont.	Cont.
J1546	TRIDENT II SHIPBOARD SYSTEMS	500	998	958	1,882	70,215
	TOTAL	68,651	53,251	65,898	Cont.	Cont.

B. (U) DESCRIPTION: The TRIDENT II (D5) Submarine Launched Ballistic Missile (SLBM) provides the U.S. a weapon of greater accuracy and payload capability as compared to the TRIDENT I (C4) system. TRIDENT II enhances U.S. strategic deterrence by providing a survivable sea-based system capable of engaging the full spectrum of potential targets with fewer submarines. This program supports continued evaluation of the system's long range performance and capabilities.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604363N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: TRIDENT II
PROJECT NUMBER: J1546 PROJECT TITLE: TRIDENT II Shipboard Systems

C. (U) DESCRIPTION: This project identifies the necessary subsystem changes to incorporate the TRIDENT II (D5) into the TRIDENT submarine baseline and develop the necessary weapon support systems and/or components. The ninth OHIO Class submarine (SSBN 734) was the first ship to accommodate the TRIDENT II (D5) Weapon System. Effort continues for investigation, identification and resolution of systems design and material problems associated with the Weapon System interface with the TRIDENT submarine baseline.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Continued to investigate, identify and resolve system design and material problems associated with the weapon system interface with the TRIDENT submarine baseline.

b. (U) Evaluated Weapon Support Systems design based on Air Conditioning Sea Trial (ACTDAS) test results.

2. (U) FY 1992 PROGRAM:

a. (U) Continue to investigate, identify and resolve system designed material problems associated with the weapon system interface with the TRIDENT submarine baseline.

b. (U) Develop long term component aging failure analysis impacts.

3. (U) FY 1993 PLANS:

a. (U) Continue to investigate, identify and resolve system design and material problems associated with the weapon system interface with the TRIDENT submarine baseline.

b. (U) Complete long term component aging failure analysis.

4. (U) PROGRAM TO COMPLETION:

a. (U) Continue to investigate, identify and resolve system design and material programs associated with the weapon system interface with the TRIDENT submarine baseline.

b. (U) Complete analysis of all required modifications, and the impact the modifications have on component/system aging. Program ends in FY 1995.

E. (U) WORK PERFORMED BY: CONTRACTORS: General Dynamics, Electric Boat Division, Groton, CT.

F. (U) RELATED ACTIVITIES: Not Applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

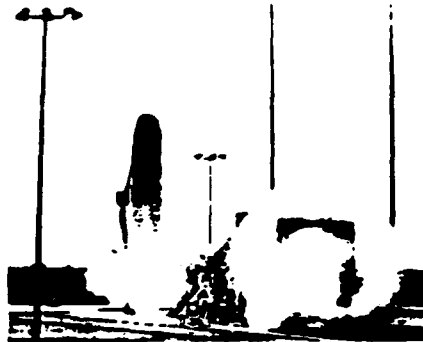
PROGRAM ELEMENT: 0604363N

BUDGET ACTIVITY: 3

PROGRAM ELEMENT TITLE: TRIDENT II

PROJECT NUMBER: J0951

PROJECT TITLE: TRIDENT II Missile



POPULAR NAME: TRIDENT II

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program				
Milestones				
Engineering				
Milestones				
T&E	OT III BEGAN:			
Milestones	NOV			
Contract				
Milestones				
BUDGET (\$K)	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
Major				
Contract	59851	40153	52040	CONT.
Support				
Contract	6200	2600	4200	CONT.
In-House				
Support	2100	9500	8700	CONT.
GFE/ Other				
TOTAL	68151	52253	64940	CONT 1/

1/ Costs include: SLBM Effectiveness Enhancement (SEE) through FY1992, SLBM Retargeting System (SRS), payment of TRIDENT II development program estimated incentives, development of portable vans, and further focus on four additional areas: yield accuracy, missile support, integrated shipboard subsystems, and TRIDENT system support.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604363N

BUDGET ACTIVITY: 3

PROGRAM ELEMENT TITLE: TRIDENT II

PROJECT NUMBER: J0951

PROJECT TITLE: TRIDENT II Missile

B. (U) DESCRIPTION: The TRIDENT II (D5) Submarine Launched Ballistic Missile (SLBM) provides the U.S. a weapon of greater accuracy and payload capability as compared to the TRIDENT I (C4) system. TRIDENT II enhances U.S. strategic deterrence by providing a survivable sea-based system capable of engaging the full spectrum of potential targets with fewer submarines. This program supports continued evaluation of the system's long range performance and capabilities.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:

a. (U) TRIDENT II Training Program efforts concluded with the completion of contractor curricula development.

b. (U) Development contractors performance was evaluated and appropriate incentive payments were made.

c. (U) The SLBM Retargeting System (SRS) achieved Initial Operating Capability (IOC) of Phase One which incorporated a limited capability onboard SSBNs. Phase Two efforts began and will lead to handling a greater number of target changes from Joint Strategic Target Planning Staff (JSTPS) in a shorter time.

d. (U) Effort continued on the system concept for portable flight test instrumentation vans to replace launch area downrange support ships at the test ranges.

e. (U) SLBM Effectiveness Enhancement (SEE) efforts continued in order to resolve critical technology issues associated with maintaining and enhancing the capability of TRIDENT II (D5).

2. (U) FY 1992 Program:

a. (U) Earned incentive payments on development contracts remain to be paid.

b. (U) The SLBM Retargeting System (SRS) efforts will support development of Phase Two scheduled to complete in FY1994.

c. (U) Effort for portable flight test instrumentation vans will concentrate on system definition and technology selection.

d. (U) Congress mandated that not less than \$4.5M be spent on support of a Gravity Sensor System (GSS) program. Efforts will support proof of concept and initial software design.

e. (U) The Congressionally directed study on characterization of propellant sensitivities in response to the Drell report will begin. The \$15M appropriated for this year will initiate a four year effort for analytical modeling, experimental impact testing and small scale material characterization testing.

f. (U) Continue to investigate alternative mechanizations within the weapon system to understand the system implications of potential responses to both the issues raised by the Drell panel and those currently being considered by the Fail Safe and Risk Reduction (FARR) commission.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604363N

BUDGET ACTIVITY: 3

PROGRAM ELEMENT TITLE: TRIDENT II

PROJECT NUMBER: J0951

PROJECT TITLE: TRIDENT II Missile

g. (U) The TRIDENT II R&D program has been restructured to support investigations of four specific areas:

(1) (U) Missile Support: This effort will examine issues which arise directly from the delay in providing the TRIDENT II capability to the Pacific Fleet TRIDENT SSBNs (D5 Backfit). Technologies will be examined to alleviate production difficulties in light of the rapidly decreasing production base and significant increase in environmental restrictions.

(2) (U) Integrated Shipboard Subsystems (ISS): This effort will focus on an examination of alternative architectures with combined subsystem functions. The current system features distributed computers but an alternative system design might feature integrated functions to alleviate acquisition difficulties of the TRIDENT II subsystem due to production problems caused by a delayed TRIDENT II backfit decision.

(3) (U) Yield/Accuracy: Effort will focus on areas that provide the capability of holding the full target spectrum at risk in the absence of required numbers of high yield warheads. Improvements in the missile guidance system in conjunction with a W76 warhead in a MK5 reentry body shell will be investigated.

(4) (U) TRIDENT Systems Studies: This effort will conduct limited exploration into changing requirements on the TRIDENT II FBM weapon system. It will support assessment of potential responses to the rapidly changing world environment as reflected in modified targeting requirements on FBM systems.

3. (U) FY 1993 Plans:

a. (U) Development program incentive payments will continue to be paid.

b. (U) Effort will continue to support Phase Two development of the SLBM Retargeting System (SRS)

c. (U) Portable flight test instrumentation vans effort will be focused on development of a system specification, component selection and field demonstration.

d. (U) Effort will continue to support development of the GSS program. Prototyp software will be developed, implemented and tested onboard the Navigation Test Ship.

e. (U) The propellant characterization study is planned to continue. This year's study will continue experimental impact testing and analytical modeling.

f. (U) Studies to investigate alternative mechanizations within the weapons system to enhance safety or use control features will continue.

g. (U) Efforts in support of the four major elements of the restructured TRIDENT II R&D program will continue. Specifically:

(1) (U) Missile Support: This effort will examine solutions to TRIDENT II (D5) production difficulties.

(2) (U) Integrated Shipboard Subsystems (ISS): Effort will continue on possible integrated subsystems with alternative architectures.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604363N

BUDGET ACTIVITY: 3

PROGRAM ELEMENT TITLE: TRIDENT II

PROJECT NUMBER: J0951

PROJECT TITLE: TRIDENT II Missile

(3) (U) Yield/Accuracy: Investigation of improvements in the guidance system in conjunction with a W76 warhead in a MK5 reentry body shell with proof of concept and extensive modeling and simulation capability development.

(4) (U) TRIDENT Systems Studies: This effort will continue limited exploration into changing requirements on the TRIDENT II FBM weapon system. It will support assessment of potential responses to the rapidly changing world environment as reflected in modified targeting requirements on FBM systems.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Strategic Systems Programs, Washington, D.C. CONTRACTORS: General Electric Company, Ordnance Systems, Pittsfield, MA; PARAMAX Systems Corp., Great Neck, NY; Charles Stark Draper Laboratory, Cambridge, MA; Lockheed Missiles and Space Company, Sunnyvale, CA; and others.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not Applicable.

2. (U) SCHEDULE CHANGES: Not Applicable.

3. (U) COST CHANGES: FY 1993 \$-23,892K reflects reduction to and subsequent thorough restructuring of the SLBM Effectiveness Enhancement Program (-38,892K) partially offset by the introduction of the DRELL Propellant Study (+15,000K).

F. (U) PROGRAM DOCUMENTATION: DCP-2/87; TEMP-8/89; OR # 196-02-88 (SRS)-1/88

G. (U) RELATED ACTIVITIES: Program Element 0101221N, Fleet Ballistic Missile System, Project J0091. Developments related to deployed POSEIDON (C3) and TRIDENT I (C4) Strategic Weapons Systems.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT					
WPN LI 243	1,511.0	1,195.4	986.8	CONT.	CONT.
(U) MILCON	70.5	9.2	-	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable

J. (U) MILESTONE SCHEDULE: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604366N BUDGET ACTIVITY: 4
 PROGRAM ELEMENT TITLE: STANDARD MISSILE IMPROVEMENTS
 PROJECT NUMBER: 80439 PROJECT TITLE: STANDARD MISSILE IMPROVEMENTS

POPULAR NAME: SM-2 BLOCK IIA

A. (U) SCHEDULE/BUDGET INFORMATION: (DOLLARS IN THOUSANDS)

SCHEDULE	FY 1991	FY 1992	FY 1993	TO COMPLETE
PROGRAM				CONTINUING
MILESTONES				
ENGINEERING				CONTINUING
MILESTONES				
T&E				CONTINUING
MILESTONES				
CONTRACT				CONTINUING
MILESTONES				
BUDGET (\$K)	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
MAJOR CONTRACT	32,970	24,921	29,220	CONTINUING
SUPPORT CONTRACT	399	0	0	CONTINUING
IN-HOUSE SUPPORT	14,645	11,619	5,720	CONTINUING
GPE/ OTHER	0	0	0	CONTINUING
TOTAL	48,014	36,540	34,940	CONTINUING

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604366N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: STANDARD MISSILE IMPROVEMENTS
PROJECT NUMBER: 80439 PROJECT TITLE: STANDARD MISSILE IMPROVEMENTS

B. (U)

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Completed contract definitization (Block IIIB).
- b. (U) Completed White Sands Missile Range flight testing

(Block IIIA).

- c. (U) Completed DT/OT (Block IIIA).
- d. (U) Developed documentation to support MS III (Block IIIA).
- e. (U) Completed documentation of the SM-2 program (Block IIIA).
- f. (U) Completed data analysis of flight testing (Block IIIA).
- g. (U) Continued FSED (Block IIIB).
- h. (U) Completed NPDM review (Block IIIB).

2. (U) FY 1992 PROGRAM:

- a. (U) Conducted PRDR in 10/91 (Block IIIA).
- b. (U) Completed Production Readiness Review (PRR) in 11/91

(Block IIIA).

- c. (U) Complete
- d. (U) Release CU
- e. (U) Continue FSED (Block IIIB).
- f. (U) Complete

3. (U) FY 1993 PLANET

- a. (U) Continue FSED (Block IIIB).
- b. (U) Achieve
- c. (U)

- d. (U)
- e. (U)

- f. (U) Complete
- g. (U) Release for

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604366N BUDGET ACTIVITY: 4
 PROGRAM ELEMENT TITLE: STANDARD MISSILE IMPROVEMENTS
 PROJECT NUMBER: 80439 PROJECT TITLE: STANDARD MISSILE IMPROVEMENTS

D. (U) WORK PERFORMED BY: IN-HOUSE: NWC, China Lake, CA; NSWC, Dahlgren, VA. CONTRACTORS: Johns Hopkins University, APL, Laurel, MD; General Dynamics, Pomona, CA; Raytheon Company, Bedford, MA; Motorola GEG, Scottsdale, AZ; Allied Signal, Communications Division, Baltimore, MD; RCA, Moorestown, NJ.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: Not Applicable.
2. (U) SCHEDULE CHANGES:
 as a result of program restructure directed at 6/91 NPDM.
3. (U) COST CHANGES: An increase of \$15.0M in FY93 to fund Block IIIB program stretchout directed at 6/91 NPDM.

F. (U) PROGRAM DOCUMENTATION:

AP 408-85 Amendment 2 TAB approved	6/86
PEM signed	10/85
J&A approved	3/86
PMP 85-02 approved	5/86
PMP IIIB (MHIP) 89-1 approved	7/89
III/IIIA TEMP 623-1 Change 1 approved	6/89
III/IIIA TEMP 623-1 REV 1, CH 1 Navy approval	11/90
NDCP approved	5/88
IIIB (MHIP) NDCP submitted to OPNAV	9/91
IIIB (MHIP) AP SEA 89-02/AIR 88-28 (Rev 1) approved	7/91
BASLINE documentation at OSD for approval	
IIIB TEMP 623-3 submitted to COTF	9/91

G. (U) RELATED ACTIVITIES: PE 0603318N, ADV S/A Missile. Ordnance section provided as Government Furnished Equipment to RAYTHEON for SM-2 Block IV Missile.

H. (U) OTHER APPROPRIATION FUNDS: (DOLLARS IN THOUSANDS)

WEAPONS PROCUREMENT, NAVY:					
	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
P-1 #9					
BLK III					
(U) FUNDS	210,638	0	0	0	0
(U) QUANTITY	305				
BLK IIIA					
(U) FUNDS	76,607	265,524	256,783	0	0
(U) QUANTITY	100	330	330		
P-1 #24					
BLK IIIB*					
(U) FUNDS	0	7,607	13,014		CONTINUING
(U) KIT QUANTITY	0	0	100		CONTINUING

* Block IIIB quantity and funding changes reflect 6/91 NPDM.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) TEST AND EVALUATION: This information is included in the FY 1993 Congressional Data Sheets.

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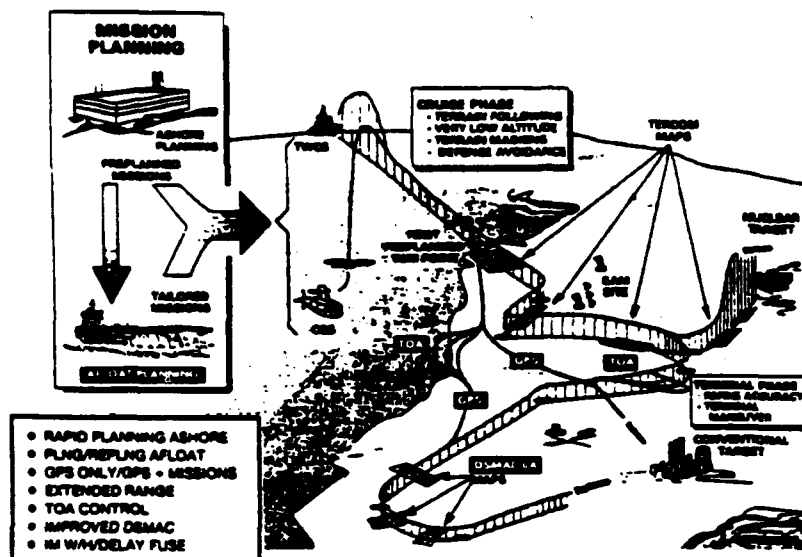
FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0604367N

Budget Activity: 4

Program Element Title: TOMAHAWK-THEATER MISSION PLANNING CENTER

Program Number: A1784 Project Title: THEATER MISSION PLANNING



POPULAR NAME: Theater Mission Planning Center Upgrade(TMPCU) /
Afloat Planning System (APS)

A. (U) SCHEDULE/BUDGET INFORMATION:

SCHEDULE	FY 1991	FY 1992	FY 1993	To Complete
Program	MS2 TSCM		IOC/TMPCU	
Milestones	(SEP)		(MAR/SEP)	
			MS 2A/IOC	
			APS (JUN)	

Engineering Milestones

TMPCU
S/W DesRev
APS DesRev

T&E Milestones

DT/OTIIA
TMPCU
DT/OTIIB
APS
OPEVAL/
FOT&E
TMPCU
DT IIB/OT IIB
OPEVAL APS

Contract Milestones

TMPCU
APS
TMPCU
APS
TSCM
TMPCU
APS

BUDGET (\$K)	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
Major	9,027	28,243	2,651	54,872
Contract				0
Support	0	0	0	0
Contract				0
In-House	3,140	4,885	1,061	10,781
Support				0
GFE/Other	0	0	0	0/0
Total	12,167	33,128	3,712	65,653

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0604367N Budget Activity: 4
Program Element Title: TOMAHAWK-THEATER MISSION PLANNING CENTER
Program Number: A1784 Project Title: THEATER MISSION PLANNING

B. (U) DESCRIPTION: The Tomahawk Theater Mission Planning Center Upgrade (TMPCU) ashore and Afloat Planning System (APS) provide data base generation and processing, flight mission data, command and control information preparation, and distribution for nuclear and conventional land attack missiles (TLAM). The TMPCU project designs and develops software to decrease mission planning time in response to contingency requirements, improves the production of mission data for distribution and provides automated command and control information for employment and strike planning. APS utilizes the TMPCU's software on down-sized and ruggedized computer hardware for use in support of Afloat Strike Warfare Commanders. This improves battle-group tactical flexibility and responsiveness while maximizing Tomahawk Weapon Systems (TWS) wartime capability. APS includes the Tomahawk Strike Coordination Module (TSCM) which is a software program that facilitates coordinated planning of Cruise Missile. These systems will be compatible with the Navy Command and Control Systems (NCCS), TMPC/TMPCU ashore and the TWS.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:
 - a. (U) Continued TMPCU Upgrade program development.
 - b. (U) Accepted the TMPCU Digital Imagery Workstation Suite (DIWS) for integration.
 - c. (U) Continued APS including TSCM development.
2. (U) FY 1992 Plans:
 - a. (U) Continue TMPCU development to include mass media storage device, and TMPCU integration and development testing.
 - b. (U) Continue APS development, Engineering Development (EDM) installation and development testing.
 - c. (U) Develop APS TSCM software.
3. (U) FY 1993 Plans:
 - a. (U) TMPCU IOC.
 - b. (U) APS TECHEVAL, OPEVAL and IOC.
4. (U) To Complete: Program Complete

D. (U) WORK PERFORMED BY: IN-HOUSE: NSWC, Dahlgren, VA; NAC, Indianapolis, IN; Naval Electronic Systems Engineering Activity Detachment (NESEA Det), Philadelphia, PA; Applied Physics Laboratory, Johns Hopkins University, Laurel MD; CINCPAC, Camp Smith, HI; CINCLANT, Norfolk, VA; NADC, Warminster, PA. Contractors: McDonnell Douglas Missiles System Company, St. Louis, MO; Tiburon System Inc., San Jose, CA; Science Application Inc., Arlington, VA; General Dynamics Electronics, San Diego, CA.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0604367N Budget Activity: 4
Program Element Title: TOMAHAWK-THEATER MISSION PLANNING CENTER
Program Number: A1784 Project Title: THEATER MISSION PLANNING

E. (U) COMPARISON WITH THE FY 1992/1993 PRESIDENT'S BUDGET:

1. (U) ENGINEERING CHANGES: None.

2. (U) SCHEDULE CHANGES: TMPCU and the associated Afloat Planning System deliveries have slipped because of software development problems on the part of the contractor. The slip in IOC from October 1992 to March/September 1993 does not have major impacts because the current mission planning software is available and in use world wide. However, the slip in the TMPCU software delays the IOC for APS which uses the same software from July 1992 until June 1993.

3. (U) COST CHANGES: Reduction of \$4,111 in FY 1993 deletes Air Warfare support of Integrated Strike Planning.

F. (U) PROGRAM DOCUMENTATION:

	<u>TOR</u>	<u>DOP</u>	<u>OR</u>	<u>NDGP</u>	<u>TEMP</u>
TMPC Upgrade	N/A	N/A	N/A	8/88	12/88*
APS	6/86	9/87	N/A	8/88	12/88*

* Revised TEMP in Process

G. (U) RELATED ACTIVITIES:

PE 0204229N (Surface Combatant Ordnance - TOMAHAWK)
PE 0604370N (SSN-688 Class Vertical Launch System)
PE 0604707N (Theater Mission Plan Center)

H. (U) OTHER APPROPRIATION FUNDS: (Dollar in Thousands)

	<u>FY 1991</u>	<u>FY 1992</u>	<u>FY 1993</u>	<u>To</u>	<u>Total</u>
<u>APPN/P-1</u>	<u>Actual</u>	<u>Estimate</u>	<u>Estimate</u>	<u>Complete</u>	<u>Program</u>
WPN/#5,18	[Procurement justification material does not				
OPN/#182,183	contain this level of detail.]				

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) TEST AND EVALUATION: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0604372N

Budget Activity: 4

Program Element Title: NEW THREAT UPGRADE (NTU)

A. (U) RESOURCES: (DOLLARS IN THOUSANDS)

PROJECT NUMBER	TITLE	FY1991 ACTUAL	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
SO188	NEW THREAT UPGRADE	5,278	4,867	2,004	CONTINUED	CONTINUED
SO964	TARTAR SM-2/NTU	5,786	5,048	4,162	CONTINUED	CONTINUED
TOTAL		11,064	9,915	6,166	CONTINUED	CONTINUED

B. (U) DESCRIPTION: This program element develops shipboard weapon engagement system improvements needed to counter current and projected anti-ship cruise missile threats at extended ranges and

The New Threat Upgrade (NTU) program is applicable to a total of 27 TERRAM and TARTAR guided missile cruisers and destroyers. The SM-2 Block I modification is a prerequisite for the follow-on NTU/SM-2 Block II and III modifications to weapon direction systems (WDS), guided missile fire control systems (GMFCS), guided missile launching system (GMLS), and communications tracking sets (CTS) in various ship classes.

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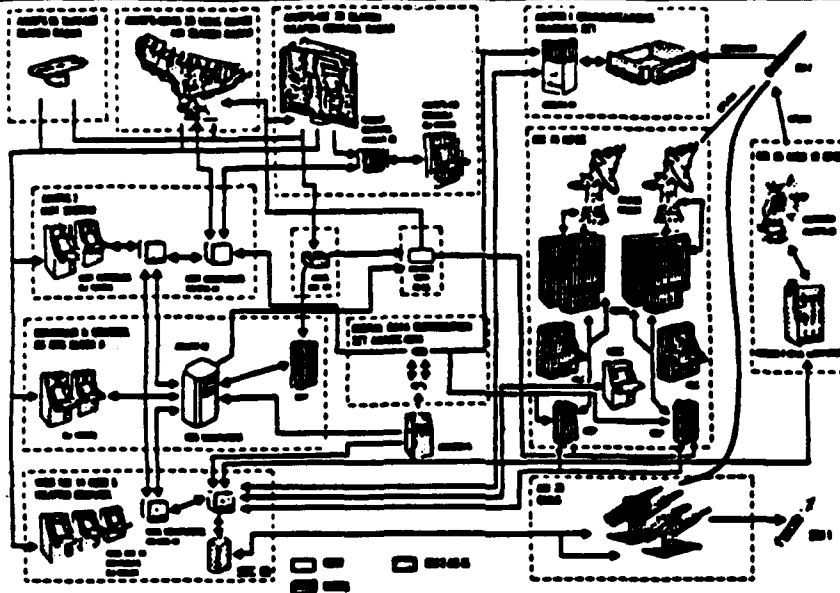
FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0604372N

Budget Activity: 4

Program Element Title: New Threat Upgrade (NTU)

Project Number: S0964 Project Title: TARTAR SM-2/NTU



POPULAR NAME: TARTAR NTU

A.(U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program				
Milestones				CONTINUING PROGRAM
Engineering			WDS PDR	
Milestones			CTS PDR	CONTINUING PROGRAM
T&E			DT IIIF	
Milestones	DT-IIIE	DT-IIIF	OT-IIIC	CONTINUING PROGRAM
Contract	INITIATED	CONTINUE	INITIATE	
Milestones	CGN-36	CGN-36	SM-2 BLK	
	NTU	NTU	III IMP.	
	TESTS	TESTS	TESTS	CONTINUING PROGRAM

BUDGET (\$K)	FY 1991	FY 1992	FY 1993	PROG. TOTAL TO COMPLETE
Major				
Contract	4.367	4.250	1.975	CONTINUING PROGRAM
Support				
Contract				
In-House				
Support	1.350	730	2.137	CONTINUING PROGRAM
GFE/				
Other	69	68	50	CONTINUING PROGRAM
TOTAL	5.786	5.048	4.162	CONTINUING PROGRAM

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FY 1993 RDTEE, NAVY DESCRIPTIVE SUMMARY

Program Element: 0604372N

Budget Activity: 4

Program Element Title: New Threat Upgrade (NTU)

Project Number: S0964 Project Title: TARTAR SM-2/NTU

B. (U) DESCRIPTION: This project develops modifications to the TARTAR weapon engagement system to provide a large increase in anti-air warfare engagement system capability. The system increased engagement system capability

This effort includes a continuation of development and adaptation of baseline CGN/SM-2 and NTU computer programs and related systems documentation for integration into the combat systems in TARTAR ships. The modifications also incorporate changes

This project supports modification of the AAW engagement system to provide compatibility between the NTU detection system and the SM-2 Block III Missile to enhance performance against low altitude/crossing targets in a severe ECM environment.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Successfully completed Contractor Integration Testing (CIT) and DT-IIIE Land-Based testing for CGN-36.
- b. (U) Completed efforts in developing modifications to correct deficiencies identified during CIT and DT-IIIE testing.
- c. (U) Successfully completed TRIAD (Integration of Command & Control, Detection and Engagement Systems) testing at Fleet Combat Direction Systems Support Activity (FCDSSA) Dam Neck.
- d. (U) Initiated Combat System Integration Testing (CSIT) at Integrated Combat System Test Facility (ICSTF).

2. (U) FY 1992 PROGRAM:

- a. (U) Complete CSIT at ICSTF.
- b. (U) Complete efforts in developing modifications to correct deficiencies identified during TRIAD and CSIT testing.
- c. (U) Initiate shipboard Development Testing DT-IIIF aboard CGN-36.

3. (U) FY 1993 PLANS:

- a. (U) Complete DT-IIIF aboard CGN-36.
- b. (U) Conduct Operational Testing (OT)-IIIC aboard CGN-36.
- c. (U) Analyze and correct DT-IIIE/OT-IIIC deficiencies.
- d. (U)

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0604372N **Budget Activity:** 4
Program Element Title: New Threat Upgrade (NTU)
Project Number: S0964 **Project Title:** TARTAR SM-2/NTU

4. (U) PROGRAM TO COMPLETION: This is a continuing program to maintain a TARTAR Weapon Engagement System capable of countering the advancing threat and provide for:

a. (U) Continue algorithm development for the MIM, initiate and prepare WDS MK 14 Mod 5, AM/SYR-1 CTS, MK 26 GMLS, and MK 13 GMLS modifications, test plans and system documentation, perform Shore-Based, CIT, and Ship-Board testing and analyze/correct deficiencies.

b. (U) Adaptation of computer programs and related systems documentation to exploit SM-2 missile performance improvements.

c. (U) Development of TARTAR Weapons System improvements to correct deficiencies identified during Developmental and Operational testing of each ship class.

D. (U) WORK PERFORMED BY: IN-HOUSE: Fleet Combat Directions Systems Support Activity, Dam Neck, VA; Naval Surface Warfare Center, Dahlgren, VA; Naval Ship Weapon Systems Engineering Station, Port Hueneme, CA.
CONTRACTORS: Johns Hopkins University, Applied Physics Laboratory, Laurel, MD; Vitro Corporation, Silver Spring, MD; Unisys Corp. Great Neck, NY; General Dynamics, Pomona, CA; FMC Naval Systems Division, Minneapolis, MN; E-Systems, ECI Division, St. Petersburg, FL; Republic Electronics, Hauppauge, NY.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) **TECHNICAL CHANGES:** Not Applicable.
2. (U) **SCHEDULE CHANGES:** Not Applicable.
3. (U) **COST CHANGES:** Not Applicable.

F. (U) PROGRAM DOCUMENTATION:

TEMP 731	FEB 88
Navy Training Plan	MAY 88
(Engagement System)	
Integrated Logistic	MAR 88
Support Plan (306-P/D)	
NDCP/D	FEB 81

G. (U) RELATED ACTIVITIES: Program Element 0604366N (STANDARD Missile Improvements) supports development of STANDARD Missile-2 Block II/IIIA round improvements. Program Element 0603382N (Battle Group AAW Coordination) develops improved Battle Force AAW coordination using AEGIS capabilities which includes SM-2/NTU ships.

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) TEST AND EVALUATION DATA: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0604372N

Budget Activity: 4

Program Element Title: NEW THREAT UPGRADE (NTU)

Project Number: 80188 Project Title: NEW THREAT UPGRADE (NTU)

B. (U) DESCRIPTION: This project develops modifications required to provide TERRIER NTU Weapon Engagement System (installed/scheduled to be installed) in 17 ships (CG 16/27 Classes) the capability to engage¹ with STANDARD extended range missiles (SM-1(ER) Blk V; SM-2(ER) Blk II/III).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Completed land based testing of Low Altitude Readiness Improvement Program (LARIP) Phase I
- b. (U) Continued design/development of modifications to fully exploit SM-2(ER) Blk III round capabilities, correct deficiencies from testing and lessons learned during fleet operations.
- c. (U) Completed LARIP Phase I computer programs at-sea testing aboard NTU TERRIER hull.

2. (U) FY 1992 PROGRAM:

- a. (U) Complete design of LARIP follow on Pulse/Doppler Integration (PDI) changes to exploit SM-2(ER) BLK III missile performance capabilities.
- b. (U) Conduct land based testing of LARIP/PDI
- c. (U) Continue design/development of modifications to correct deficiencies from testing and lessons learned during fleet operation.

3. (U) FY 1993 PLANS:

- a. (U) Complete LARIP/PDI Land based and at-sea testing modifications to exploit SM-2(ER) Blk III capabilities.
- b. (U) Continue design/development of modifications to correct deficiencies from testing and lessons learned from fleet operation.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Fleet Combat Directions Systems Support Activity, Dam Neck, VA; Naval Surface Warfare Center, Dahlgren, VA; Naval Ship Weapon Systems Engineering Station, Ft. Huachuca, CA. CONTRACTORS: Johns Hopkins University, Applied Physics Laboratory, Laurel, MD; Vitro Corporation, Silver Spring, MD; Raytheon, Wayland, MA; Unisys Corp. Great Neck, NY; General Dynamics, Pomona, CA; FMC Naval Systems Division, Minneapolis, MN; E-Systems, ECI Division, St. Petersburg, FL; Republic Electronics, Hauppauge, NY.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

- 1. (U) TECHNICAL CHANGES: Not Applicable.
- 2. (U) SCHEDULE CHANGES: Not Applicable.
- 3. (U) COST CHANGES: Not Applicable.

F. (U) PROGRAM DOCUMENTATION:

TEMP 547	APR 88
Navy Training Plan	SEP 88
(Engagement System)	
Integrated Logistic	AUG 88
Support Plan (084-4/5)	
NDCP	FEB 81

G. (U) RELATED ACTIVITIES: Program Element 0604366N (Standard Missile Improvements) supports development of Standard Missile-2 Block III/IIIA round improvements.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0604372N Budget Activity: 4
Program Element Title: NEW THREAT UPGRADE (NTU)
Project Number: 80188 Project Title: NEW THREAT UPGRADE (NTU)

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

FY1991 Actual	FY1992 Estimate	FY1993 Estimate	To Complete Continuing	Total Program Continuing
14,360	19,459	20,558		

(U) PROCUREMENT: OPN #177 TERRIER SUPPORT EQUIPMENT (includes TERRIER CG/SM-2, TERRIER NTU and Post-NTU improvements)

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) TEST AND EVALUATION DATA: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604502N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Submarine Communications

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPL	TOTAL PROGRAM
X0742	Submarine Integrated Antenna System	9,552	11,690	13,974	CONT.	CONT.
X1411	Submarine Tactical Communication Systems	1,663	2,198	1,976	CONT.	CONT.
	TOTAL	11,215	13,888	15,950	CONT.	CONT.

B. (U) DESCRIPTION: The Submarine Integrated Antenna Systems project develops the antennas needed to communicate in new networks such as Ultra-High-Frequency Satellite Communications, Extremely-Low-Frequency (ELF), Extremely-High-Frequency (EHF), and Global Positioning System. Hardware developments include: (a) mast-mounted systems; (b) buoyant cable systems; (c) expendable buoy systems, and (d) towed buoy systems. The objectives of the Submarine Tactical Communication Systems project are to provide attack submarines with an exterior communications system which (a) minimizes time required at communications depth, (b) enhances operability, reducing errors and manpower requirements, and (c) provides flexibility for low impact growth and change throughout the life of the submarine. Design efforts will provide increased time and frequency distribution, antenna signal distribution and interconnection subsystems to accommodate ELF, EHF, and mini-Demand Assigned Multiple Access (DAMA) and a message storage and processing subsystem.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604502N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Submarine Communications
PROJECT NUMBER: X0742 PROJECT TITLE: Submarine Integrated Antenna Systems

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPL	TOTAL PROGRAM
X0742	SIAS	9,552	11,690	13,974	Cont.	Cont.

B. (U) DESCRIPTION: The purpose of this project is to provide submarines with antenna systems designed to (a) permit greater operational flexibility through improved speed/depth performance; (b) improve reliability and availability; and (c) be compatible with existing and emerging communications systems.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Completed Milestone II for Arctic Buoy; awarded Engineering Manufacturing and Development (EM&D) contract.
- b. (U) Awarded EM&D contract for AN/BST-1 upgrade.
- c. (U) Continued development of improved towed buoy auxiliary wire antenna.
- d. (U) Continued development of improved AN/BRA-34.
- e. (U) Continued development of the EHF Antenna.
- f. (U) Continued development of the High Speed Buoyant Cable Antenna.

2. (U) FY 1992 PROGRAM:

- a. (U) Complete development of High Speed Buoyant Cable Antenna.
- b. (U) Conduct Test and Evaluation (DT-IIA) of Arctic Buoy.
- c. (U) Complete Critical Design Review (CDR) of improved AN/BRA-34.
- d. (U) Conduct CDR for the AN/BST-1 upgrade.
- e. (U) Conduct CDR for the Arctic Buoy.
- f. (U) Design and repackage current Towed Buoy technology for application on SSN submarines.

3. (U) FY 1993 PLANS:

- a. (U) Conduct Technical Evaluation (TECHEVAL) (DT-IIB) of the Arctic Buoy.
- b. (U) Continue development of the AN/BST-1 upgrade.
- c. (U) Complete Milestone II for EHF antenna.
- d. (U) Issue EM&D contract for the EHF non-penetrating mast antenna.
- e. (U) Conduct DT-IIB and start OT-II Testing for High Speed Buoyant Cable Antenna.
- f. (U) Start TECHEVAL of the Improved AN/BRA-34.
- g. (U) Continue design and engineering efforts for the SSN Towed Buoy.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NUSC, New London, CT; DTRC, Carderock MD; NUWES, Keyport, WA; NAVSSES, Philadelphia, PA; CONTRACTORS: Spears Associates, Norwood, MA; TRW, Redondo Beach, CA; AMERIND, Alexandria, VA; and others to be determined.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604502N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Submarine Communications
PROJECT NUMBER: X0742 PROJECT TITLE: Submarine Integrated Antenna Systems

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not Applicable.
2. (U) SCHEDULE CHANGES: Not Applicable.
3. (U) COST CHANGES: Additional funding (\$3.7M) in FY93 is for the development and testing of the SSN Towed Buoy.

F. (U) PROGRAM DOCUMENTATION:

SIAS NDCP	3 Mar 80
Arctic Buoy TEMP	28 Sep 90
Improved AN/BRA-34 Antenna PCAD	17 Mar 89

G. (U) RELATED ACTIVITIES: PE 0602232N C3 Technology (block NU2A - submarine communications technology) provides technology input to this program. PE 0604577N, Proj X0728 - Navy EHF SATCOM Program provides for the EHF transmitter and receiver that utilize the antenna developed under this program.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991	FY 1992	FY 1993	TO	TOTAL
	ACTUAL	ESTIMATE	ESTIMATE	COMPLETE	PROGRAM
(U) APPN/P-1				CONT.	CONT.
(U) OPN #117	2,973	5,938	4,657		

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604502N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Submarine Communications
PROJECT NUMBER: X1411 PROJECT TITLE: Submarine Tactical Communication Systems

C. (U) DESCRIPTION: The purpose of the Submarine Tactical Communication Systems project is to provide attack submarines with communications systems designed to (a) enhance data throughput; (b) copy tactical data networks such as TADIXS (Tactical Data Information Exchange System); (c) be interoperable with other U.S. and allied Military networks; and (d) improve reliability, maintainability and availability. This can be accomplished by providing the attack submarine with a properly integrated mix of Navy standard communications equipment covering a wide range of frequencies and modes.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Conducted development (Prototype II) and test (DT-IIA) of Message Processing System software.
- b. (U) Evaluated Time-Frequency Distribution Subsystem candidates.
- c. (U) Evaluated EHF ephemeris data bulk storage candidates.
- d. (U) Developed Message Processing System T&E Evaluation Plan (TEMP).

2. (U) FY 1992 PROGRAM:

- a. (U) Conduct Message Processing System testing on R&D Submarine.
- b. (U) Complete Message Processing System Milestone III.
- c. (U) Continue development (P3I) and test of Message Processing System.
- d. (U) Develop Time-Frequency Distribution Subsystem Test and Evaluation Plan (TEMP).

3. (U) FY 1993 PLANS:

- a. (U) Evaluate radio room miniaturization, integration and automation systems and candidate equipments.
- b. (U) Award contract for Message Processing System source hardware.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NUSC, New London, CT; NAVOCEANSYSCEN, San Diego, CA; and NAVELEXCEN, Charleston, SC.
CONTRACTORS: Magnavox, Philadelphia, PA; ECI, St. Petersburg, FL.

F. (U) RELATED ACTIVITIES: PE 0602232N C3 Technology (block NU2A - Submarine Communications Technology) provides technology input to this program.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991	FY 1992	FY 1993	TO	TOTAL
	ACTUAL	ESTIMATE	ESTIMATE	COMPLETE	PROGRAM
(U) APPN/P-1				CONT.	CONT.
(U) OPN #117	1,143	6,384	2,770		

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604503N

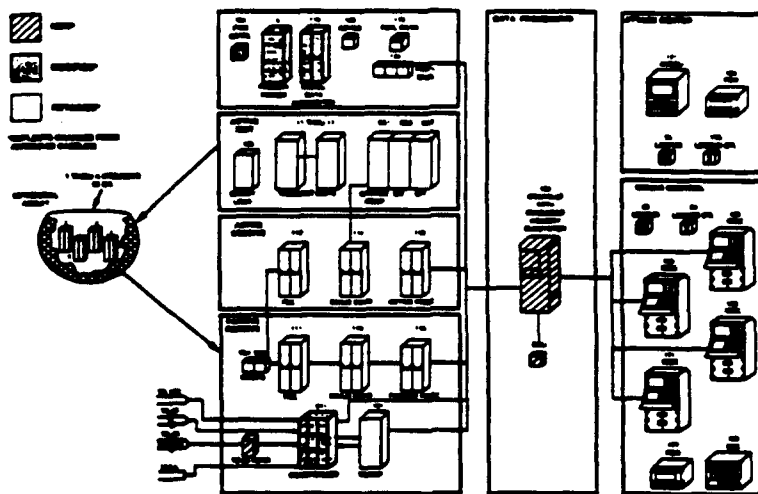
BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Submarine Sonar Development

PROJECT NUMBER: F0219

PROJECT TITLE: Submarine Sonar Improvements

AN/BQQ-5E(V)3, SSN



POPULAR NAME: Submarine Sonar System (Engineering)

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE		FY 1991	FY 1992	FY 1993	TO COMPLETE
PROGRAM	Q-5E	IIA2 3/91	IIA3 3/92	IIA4 3/93	III 4Q/94
MILESTONES	TB-29 ARRAY		IIA1 6/92	IIA2 3/93	III 4Q/94
	Q-5()/ 6881		6/92 Functional Description Complete	II 5/93	IIA 2Q/95
ENGINEERING	Q-5E	12/90 EDM	5/92 SDCT		
MILESTONES			Complete		
	TB 29 ARRAY		4/92 CDR	7/93 EDM	
	Q-5()/6881				1Q/95 CDR 1Q/98 SDCT
T&E	Q-5E			8/93 TECHEVAL	
MILESTONES	TB-29 ARRAY			12/93 OPEVAL	
	Q-5()/ 6881				TECHEVAL 3Q/98 OPEVAL 4Q/98
CONTRACT	Q-5E	Award LRIP 4/91	Award LRIP 4/92	Award LRIP 4/93	
MILESTONES					
	TB-29 ARRAY		Award LRIP 7/92	Award LRIP 4/93	
	Q-5()/ 6881			3Q/93 EMD Award	

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604503N BUDGET ACTIVITY: 4-Tactical Programs
PROGRAM ELEMENT TITLE: Submarine Sonar Development
PROJECT NUMBER: F0219 PROJECT TITLE: Submarine Sonar Improvements

BUDGET (\$K)	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
MAJOR CONTRACT	31679	33850	30010	CONTINUING
SUPPORT CONTRACT	1004	625	577	CONTINUING
IN-HOUSE SUPPORT	5516	4489	6600	CONTINUING
GFE/ OTHER	0	0	125	CONTINUING
TOTAL	38199	38964	37312	CONTINUING

B. (U) DESCRIPTION: The future operating environment and mission requirements of the submarine force will increase the demands on acoustic detection, localization, and tracking in Antisubmarine Warfare (ASW), Antisurface Warfare (ASUW), Escort and other mission areas. These requirements have necessitated developing improvements to acoustic processing, and sensor integration. This program delivers these block updates to the submarine sonar systems onboard SSN 688, and TRIDENT class submarines. The threat possesses significantly reduced radiated noise levels and improved sonar detection capability. Each hardware and software update is embodied in a block change package, such that the Combat System as a whole can capitalize on synergism of the individual improvements. The AN/BQQ-5E with TB-29 array will provide a quantum improvement in long range detection, localization, for all platforms and significantly enhance the defensive capability of TRIDENT SSBN's. Future improvements to the AN/BQQ-5()/688I will address the integration of Low Frequency Active (LFA), color displays, dual towed array processing, Full Spectrum processing, and Full Spatial Vernier Processing (SVP) for TB-29 Array.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:
 - a. (U) Continued development of AN/BQQ-5E. MSIIA2 approval obtained.
 - b. (U) Continued TB-29 development.
 - c. (U) Delivered AN/BQQ-5E EDM 12/90.
2. (U) FY 1992 PROGRAM:
 - a. (U) Continue development of AN/BQQ-5E. MSIIA3 approval.
 - b. (U) Complete System Design Certification Test for AN/BQQ-5E.
 - c. (U) Continue development of TB-29 Array. MSIIA1 approval.
 - d. (U) Functional Description complete for Q5()/688I.
3. (U) FY 1993 PLANS:
 - a. (U) Complete TECHEVAL/start OPEVAL for AN/BQQ-5E MSIIA4 approval.
 - b. (U) TB-29 Array EDM delivered. Complete TECHEVAL/Start OPEVAL. MSIIA2 approval.
 - c. (U) Complete ARB and NPDH for MSII of AN/BQQ-5()/688I.
 - d. (U) Award EDM contract for AN/BQQ-5()/688I effort.
4. (U) PROGRAM TO COMPLETION: This is a continuing program.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604503N BUDGET ACTIVITY: 4-Tactical Programs
PROGRAM ELEMENT TITLE: Submarine Sonar Development
PROJECT NUMBER: F0219 PROJECT TITLE: Submarine Sonar Improvements

D. (U) WORK PERFORMED BY: IN-HOUSE: PEO-SCWS (PMO409), Washington, DC; NUSC, New London, CT; Naval Weapons Support Center, Crane, IN; COMOPTEVFOR, Norfolk, VA; and NOSC, San Diego, CA. CONTRACTORS: International Business Machines Corp., Systems Integration Division, Manassas, VA; Martin Marietta, Ocean Systems Operation, Glen Burnie, MD; EG&G, Washington Analytical Services Center, Inc., Rockville, MD.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: None.
2. (U) SCHEDULE CHANGES: AN/BQQ-5E/TB-29 MSIII and TECHEVAL/OPEVAL slipped due to a change in the shipyard availability dates.
3. (U) COST CHANGES: \$2.7M reduction in FY 93 associated with the schedule change as well as escalation adjustments.

F. (U) PROGRAM DOCUMENTATION:

NDCP 80219 - as approved	2/86
TEMP 137-8 Rev 2	1/91
Acquisition Plan 424-87 (CHANGE 2)	1/90

G. (U) RELATED ACTIVITIES:

- Program Element 0101228N, TRIDENT I;
- Program Element 0604524N, Submarine Combat System; and
- Program Element 0604561N, SSN-21 Developments.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN #51	132,515	151,831	179,857	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None

J. (U) TEST AND EVALUATION DATA:

(U) OT-IIB - OPTEVFOR conducted on Operation Test of the AN/BQQ-5E electronics EDM at the contractor's facility in Dec 91. Test objectives were to assess the potential operational suitability, effectiveness and man-machine interface of the system. Fleet personnel were used to operate the system while at-sea simulations were conducted. The test was completed as scheduled. OPTEVFOR's test report is expected 3/92.

(U) SDCT - AN/BQQ-5E System Design Certification Testing (SDCT) will be conducted from February to May 1992 at IBM, Manassas, VA.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604504N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: AIR CONTROL

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0993	Carrier Air Traffic Control	3,282	872	1,042	Cont.	Cont.
W1579	LPH/LHA Air Traffic Control	400	0	0	0	13,000
W1657	Air Traffic Control Improvements	4,479	3,006	10,599	Cont.	Cont.
W1680	Multi-Mode Receiver	2,012	369	0	0	36,057
X0718	Marine Air Traffic Control Landing System	3,633	2,340	2,858	Cont.	Cont.
	TOTAL	13,806	6,587	14,499	Cont.	Cont.

B. (U) DESCRIPTION: This program element provides for the development, integration, and testing of automated Air Traffic Control (ATC) hardware and software required to provide improved flight safety, support more reliable all-weather ATC and landing capabilities ashore and afloat, and decrease Low Probability of Intercept radiated electromagnetic energy from ATC radars. The new systems are required to replace obsolete ATC and approach/landing equipment on aircraft, aircraft carriers, amphibious ships, Naval Air Stations, and Navy/Marine Corps tactical/expeditionary airfields and remote landing sites.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604504N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AIR CONTROL
PROJECT NUMBER: W0993 PROJECT TITLE: CARRIER AIR TRAFFIC CONTROL

C. (U) DESCRIPTION: Shipboard Air Traffic Control Centers identify, marshal and direct aircraft within 50 nm to a ships Automatic Carrier Landing System (ACLS) and Independent Landing Monitor (ILM). The Precision Approach Radar and Independent Landing Monitor then provide precise automatic control and verification of aircraft during their final approach and landing sequence. Low Probability of Intercept (LPI) emissions are required to enable aviation ships to conduct operations while preventing opposing forces from exploiting the unique electromagnetic signature of the ship.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Continued software recompile of AN/SPN-46(V) software program.
- b. (U) Continued full production of AN/SPN-46(V).

2. (U) FY 1992 PROGRAM: Complete AN/SPN-46(V) software recompile and documentation deliveries from FSD contract.

3. (U) FY 1993 PLANS: Begin initial FSD preparation for Signature Managed Air Traffic Control and Landing System (SMATCALS) in preparation for transition from advanced development to full scale development.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: COMNAVAIRSYSCOM, Washington, DC; NAVEXACT, St. Inigoes, MD; NAVAIRTESTCEN, Patuxent River, MD; NWSC, Crane, IN; NAVAVIONICEN, Indianapolis, IN; NRL, Washington, DC. CONTRACTOR: Textron Defense Systems, Wilmington, MA.

F. (U) RELATED ACTIVITIES: Not Applicable

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT:					
APPN/P-1	1217	34,176	15,133	Continuing	Continuing
OPN/#93					

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

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FY 1993 RDTEE, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604504N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: AIR CONTROL

PROJECT NUMBER: W1657 PROJECT TITLE: ATC IMPROVEMENTS

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W1657	Air Traffic Control Improvements	4,479	3,006	10,599	Cont.	Cont.

B. (U) DESCRIPTION: This program provides for the development, integration, adaptation, and testing of new and/or modernized real-time Air Traffic Control (ATC) systems, air navigational aids and landing systems, ATC communications systems i.e., Fleet Area Control and Surveillance Facility (FACSFAC) and Ranges must be modified to ensure continued interoperability with the National Airspace System (NAS).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Completed DOP.
- b. (U) Initiated development of FACSFAC Scheduling System (FACSKED).
- c. (U) Conducted market investigations and commercial/Non Development Items (NDI) trade-off analysis.

2. (U) FY 1992 PROGRAM:

- a. (U) Update initial functionality studies as force structure changes occur.
- b. (U) Develop and obtain approval of FACSKED acquisition plan.
- c. (U) Publish solicitation for FACSKED demonstration hardware.
- d. (U) Initiate development of engineering study for upgrade of ATC/Range interface.

3. (U) FY 1993 PLANS:

- a. (U) Award contract for demonstration hardware for FACSKED.
- b. (U) Develop and obtain approval of FACSKED.
- c. (U) Initiate development of a replacement ATC system for FACSFAC.
- d. (U) Publish solicitation for demonstration hardware for ATC/Ranges interface.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARIES

PROGRAM ELEMENT: 0604504N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AIR CONTROL
PROJECT NUMBER: W1657 PROJECT TITLE: ATC IMPROVEMENTS

D. (U) WORK PERFORMED BY: IN-HOUSE: COMNAVAIRSYSRON, Washington, DC;
NAVELEXCEN, Charleston, SC; NAVELEXCEN, Vallejo, CA; NAVELEXACT, St. Inigoes,
MD; NAVAIRTESTCEN, Patuxent River, MD; NAVOCEANSYSCEN, San Diego, CA;
NAVAIRDEVCEEN, Philadelphia, PA; NAVAVIONICEN, Indianapolis, IN; SODIVNAVFAC,
Charleston, SC; CONTRACTOR: TED.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) Technology Changes: None.
2. (U) Schedule Changes: None.
3. (U) Cost Changes: None.

F. (U) PROGRAM DOCUMENTATION:

TOR	12/89
DOP	12/91
TEMP	4/94
AP	10/97 (PROD)

G. (U) RELATED ACTIVITIES: None.

H. (U) OTHER APPROPRIATION FUNDS: None.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) MILESTONE SCHEDULE:
M/S III - 6/97

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604504N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: AIR CONTROL

PROJECT NUMBER: X0718

PROJECT TITLE: MATCALS

C. (U) DESCRIPTION: Provides for continued development, integration, and testing of hardware and software (S/W) to meet requirements for All-Weather operation and improved flight safety of Air Traffic Control (ATC) and Automated Landing Systems (ALS) at Navy/Marine Corps expeditionary airfields.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Successfully completed Development Testing (DT) and Operational Evaluation (OPEVAL) testing of software compatible with the AN/TPS-73 radar.
- b. (U) Commenced development of software for required Tactical Digital Information Link (TADIL)-B/C capability.
- c. (U) Commenced studies for Advanced Air Traffic Control (i.e. Automatic Landing System technology improvements & Flight Safety).

2. (U) FY 1992 PROGRAM: Continue development and testing of required operational capabilities, including tactical data links and Joint Tactical Interface Facility (JTIF) certification of TADIL B. Continue studies for Advanced Air Traffic Control. Field versions J & K operational software.

3. (U) FY 1993 PLANS: Continue development of deferred required operational capability software, including flight control and flight safety software. Test software to certify safety of flight. Certify TADIL-B changes per JTIF requirements. Continue Advanced Air Traffic Control studies.

4. (U) PROGRAM TO COMPLETION: A continuing program. Plan to develop improvements in hardware and software to increase operational availability and flight safety, e.g. Differential Global Positioning System and wind shear detection.

E. (U) WORKED PERFORMED BY: IN-HOUSE: SPANAR (Wash, DC); WESEC (Vallejo, CA); WESEA (St Inigoes, MD); NATC (Patuxent River, MD). CONTRACTOR: UNISYS (St Paul, MN); GTRI (Atlanta, GA)

F. (U) RELATED ACTIVITIES: None.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

(U) PROCUREMENT:	FY 1991	FY 1992	FY 1993	TO	TOTAL
	ACTUAL	ESTIMATE	ESTIMATE	COMPETE	PROGRAM
APPN/P-1	12,993	4,147	3,684	Cont.	Cont.
OPN/#91					

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604506N BUDGET ACTIVITY: 4
 PROGRAM ELEMENT TITLE: Chemical Warfare Countermeasures
 PROJECT NUMBER: S0410 PROJECT TITLE: Biological Radiology (BR)/
 Chemical Warfare (CW) Countermeasures

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0410	BR/CW Countermeasures	8497	5556	5944	Cont.	Cont.

B. (U) DESCRIPTION: Develop chemical, biological and radiological (CBR) defense systems required to counter threats in the near term (1990's) and predicted emerging threats in the post 2000 time frame. Includes individual and collective protection, detection and monitoring, and decontamination materials and equipment.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:
 - a. (U) Completed OPEVAL for Chemical Agent Monitor (CAM), and started OPEVAL for Shipboard and Selected Area Collective Protection Systems (CPS).
 - b. (U) Initiated DT-II of Improved Point Detector (IPD).
 - c. (U) Completed tech data spec for improvements to Army CBR filter and procured filters for test and evaluation.
 - d. (U) Completed analysis of CPS high pressure fan performance in conjunction with CBR filter installations.
 - e. (U) Completed preliminary spec for Interim-Chemical Protection Overgarment design.
2. (U) FY 1992 PROGRAM:
 - a. (U) Conduct MS III reviews for Shipboard and Selected Area CPS.
 - b. (U) Conduct TECHVAL of IPD.
 - c. (U) Initiate design of product improvements to Shipboard CPS components.
 - d. (U) Develop design solutions to CAM OPEVAL deficiencies.
3. (U) FY 1993 PLANS:
 - a. (U) Test product improvements to Shipboard CPS components.
 - b. (U) Conduct OPEVAL of IPD.
 - c. (U) Initiate full scale development of Shipboard Automatic Liquid Agent Detection (SALAD) system.
 - d. (U) Procure and test EDMs for CAM upgrade.
4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSWC, Dahlgren, VA; DTRC, Bethesda, MD; NCTRP, NRL, Washington, DC; NWSC, Crane, IN. CONTRACTORS: J.J. McMullen & Battelle, Washington, DC; Brunswick Corp., Clearwater, Fl; Donaldson Corp., Minneapolis; Battelle, Columbus, OH.

E. (U) RELATED ACTIVITIES: Program Elements 0603514N Ship Combat Survivability; 0602233N Mission Support Technology.

F. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) OPN #31	5,190	5,866	8,432	Cont.	Cont.
(U) OPN #26	0	1,000	0	Cont.	Cont.
(U) OPN #245	32,563	6,699	5,452	Cont.	Cont.
(U) O&M	0	1,335	1,529	Cont.	Cont.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0604507N Budget Activity: 4
Program Element Title: Navy Standard Signal Processor (NSSP)
Project Number: S1440 Project Title: Enhanced Modular Signal Processor (EMSP)

A. (U) RESOURCES: (Dollars in Thousands)

Project Number	Title	FY 1991 Actual	FY 1992 Estimate	FY 1993 Estimate	To Complete	Total Program
S1440	EMSP	20,134	20,321	15,300	Cont.	Cont.

B. (U) DESCRIPTION: The Enhanced Modular Signal Processor (EMSP) is a modular, distributed, parallel processor system within an open architecture to provide increased signal processing capability for ASW weapon systems.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Continued Standard Electronic Module (SEM) B Production.
- b. (U) Completed system delivery of SEM B Development Test Equipments.
- c. (U) Continued delivery of SEM E Service Test Models (STM) and software packages.
- d. (U) Completed integration testing.
- e. (U) Initiated acceptance testing (SEM E DT-IID).
- f. (U) Continued Acoustic System Integration Program (ASIP) activity to support unique SEM E user requirements.
- g. (U) Conducted Preliminary Design Reviews (PDRs) for new SEMs and software.
- h. (U) Conducted Surveillance Towed Array Sensor System (SURTASS) and Advanced Low Frequency Sonar (ALFS) Functional Configuration Reviews.
- i. (U) Prepared strategies for Congressional-directed multi-year buy for SEM E.

2. (U) FY 1992 PROGRAM: Complete SEM E DT-IID Testing, begin delivery of SEM B production units, complete kit delivery of SEM B Development Test Equipment, complete delivery of STM units, continue ASIP development for upgrading AN/UYS-2, award SEM E multi-year procurement contract.

3. (U) FY 1993 PLANS: Complete delivery of SEM B production units, continue SEM E production, continue ASIP development and initiate efforts to insert evolving technology and commercial off-the-shelf products into AN/UYS-2.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORKED PERFORMED BY: IN-HOUSE: NADC, Warminster, PA; NRL, Washington DC; NAD, Alameda, CA CONTRACTORS: AT&T (Federal Systems Advanced Technologies) Greensboro, N.C.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: None
2. (U) SCHEDULE CHANGES: None

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0604507N Budget Activity: 4
Program Element Title: Navy Standard Signal Processor (NSSP)
Project Number: S1440 Project Title: Enhanced Modular Signal Processor (EMSP)

3. (U) COST CHANGES: + \$6,038K Increased cost reflects the increase in testing, system and integration engineering support, and software maintenance support required to significantly reduce the risk to the programs which will use the AN/UYS-2.

F. (U) PROGRAM DOCUMENTATION:

DCP 3/90
TEMP 1/90
AP 12/91

G. (U) RELATED ACTIVITIES:

- Program Element 0604524N, Submarine Combat System - Provides funding for AN/BSY-2 unique interfaces and requirements for the Acoustic Systems Integration Program (ASIP).

- Program Element 0604211N, P-3 Modernization Program - Provides funding for P-3 Update IV unique interfaces and requirements for the Acoustic Systems Integration Program (ASIP).

- Program Element 0204313N, Surveillance Towed Array Sensor - Provides funding for Surface ASW Improvements unique interfaces and requirements for the Acoustic Systems Integration Program (ASIP).

- Program Element 0604713N, Surface ASW Improvements - Provides funding for AN/SQQ-89 unique interfaces and requirements for the Acoustic Systems Integration Program (ASIP).

- Program Element 0604219N, Airborne ASW Developments - Provides funding for ALPS unique interfaces and requirements for the Acoustic Systems Integration Program (ASIP).

- Program Element 0204311N, Undersea Surveillance System - Provides funding for LFA unique interfaces and requirements for the Acoustic Systems Integration Program (ASIP).

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 Actual	FY 1992 Estimate	FY 1993 Estimate	To Complete	Total Program
(U) OPN #109	2,780	3,204	4,377	Cont.	Cont.
OPN #85		91,200	62,900	Cont.	Cont.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None

J. (U) MILESTONE SCHEDULE:

(U) Acquisition Executive Initial Production Decision	2/92
(U) Multi-Year Production Contract	3/92
(U) Complete Developmental Testing	11/92
(U) Milestone III	1/93

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604508N BUDGET ACTIVITY: 4
 PROGRAM ELEMENT TITLE: Radar Surveillance Equipment
 PROJECT NUMBER: S0166 PROJECT TITLE: SPS Improvement Program

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0166	SPS Improvement Program	4,590	7,986	8,198	CONT.	CONT.

B. (U) DESCRIPTION: This program develops and tests performance and reliability upgrades for search radar equipment used on ships.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- (U) Improved SYS-2(V) series capabilities (IFF, EO, ESM).
- (U) Completed SPS-49 Medium PRF Upgrade (MPU)/Digital Side Lobe Canceler (DSL/C) development/test.
- (U) Continued Anti-Ship Missile Defense (ASMD) Horizon Emphasis Radar development.
- (U) Continued modifications to SPS-67/49 IFF antenna for ESM.

2. (U) FY 1992 PROGRAM:

- (U) Study radar related ship self defense issues.
- (U) Continue development/test of ASMD Horizon Emphasis radar.
- (U) Continue SYS-2(V) Series Improvements (IFF, EO, ESM).
- (U) Evaluate SPS-49 MPU system performance.
- (U) Evaluate SPS-48E Low Elevation field change.
- (U) Investigate options to improve MK 23 Target Acquisition System (TAS) Radar.

3. (U) FY 1993 PLANS:

- (U) Continue studying radar ship self defense issues and conduct associated evaluations.
- (U) Begin FSED of ASMD Horizon Emphasis radar.
- (U) Continue SYS-2(V) Series Improvements (IFF, EO, ESM).
- (U) Evaluate SPS-49 MPU transition to production.
- (U) Evaluate fleet introduction of SPS-48E Low Elevation field change.
- (U) Investigate options to improve MK 23 TAS Radar.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSWC, Dahlgren, VA; NWSOC, Crane, IN; NSWSES, Port Hueneme, CA; NRL, Washington, DC; CONTRACTORS: Raytheon, Wayland, MA; JHU/APL, Laurel, MD; ITT Gilfillan, Van Nuys, CA; Norden Systems, Melville, NY.

E. (U) RELATED ACTIVITIES: PE 0604307N, Aegis CSE; PE 0604372N, New Threat Upgrade; PE 0603319N, NATO AAW Systems; PE 0604211N, IFF Systems Development; PE 0604301N, MK-92 FCS Upgrade; PE 0603755N, Ship Self Defense.

F. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT:					
OPN: P1 Line Items #43, #44, #45, #46, #48	106,952	63,563	66,579	CONT.	CONT.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604514N

BUDGET ACTIVITY: 5

PROGRAM ELEMENT TITLE: Navigation Systems

PROJECT NUMBER: P0253 PROJECT TITLE: Navigation & Electro-Optic (E-O) Support

A. (U) RESOURCES: (Dollars in thousands)

PROJECT NUMBER	TITLE	FY1991 ACTUAL	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
P0253	NAVIG. & ELECTRO-OPTIC (E-O) SUPPORT	5,260	4,106	2,897	CONT.	CONT.

B. (U) DESCRIPTION: There are two major efforts in this project the Photonics Mast Program and the Doppler Sonar Velocity Log. The Photonics Mast will replace existing penetrating periscopes, and exploit a wide portion of the electro-magnetic spectrum through advanced electro-optical imaging and fiber optics. It will provide major improvements in submarine stealth and infrared imaging capabilities and make extensive use of image enhancement techniques for target identification and classification. The non-hull penetrating design provides freedom in ship construction design as well as space savings. The system will be designed to satisfy Operational Requirement #168-02-88. The Doppler Sonar Velocity Log (DSVL) is a high accuracy velocity meter being developed for precise measurement of own ship's relative and absolute speed. The DSVL will minimize speed errors introduced into the fire control solution.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Conducted Photonics Mast Atmospheric Propagation Analysis.

b. (U) Initiated development of Photonics Mast type A specification.

c. (U) Generated draft Photonics Mast Test and Evaluation Master Plan (TEMP) and Integrated Logistic Support Plan (ILSP).

d. (U) Updated DSVL TEMP and Navy Training Plan.

e. (U) Completed DSVL Prism Computer Model and Back Plane Update.

f. (U) Upgraded DSVL Detectability Instrumentation.

g. (U) Commenced DSVL firmware development.

2. (U) FY 1992 PROGRAM:

a. (U) Award Photonics Mast Concept Definition contracts.

b. (U) Conduct Photonics Mast Concept Definition reviews.

c. (U) Generate final Photonics Mast TEMP and ILSP.

d. (U) Complete DSVL Prism Transducer, firmware development and hardware development.

e. (U) Update DSVL ILSP

3. (U) FY 1993 PLANS:

a. (U) Milestone II approval and issue Photonics Mast Engineering and Manufacturing Development (EMD) Request for Proposals.

b. (U) Conduct Photonics Mast System Design Review.

4. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NUSC, New London, CT; NAVAIRDEVCEC, Warminster, PA; NOSC, San Diego, CA; NRL, Washington, DC; NAVSSES, Philadelphia, PA; DTRC, Bethesda, MD. CONTRACTORS: Photonics Mast - TBD, DSVL - Sperry Marine Inc., Charlottesville, Va.

E. (U) RELATED ACTIVITIES: PE 0603226E Experimental Evaluation of Innovative Technology - Non-Penetrating Periscope (NPP) being developed by Kollmorgen for DARPA.

F. (U) OTHER APPROPRIATION FUNDS: DSVL only - (Dollars in Thousands)

(U) PROCUREMENT	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
SCN/BLT #12	7,253	0*	0*	CONT.	CONT.

* No new procurement until 1994

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604515N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: Submarine Support Equipment Program
PROJECT NUMBER: P0775 **PROJECT TITLE:** Submarine Support Equipment Program

A. (U) RESOURCES: (Dollars in thousands)

PROJECT NUMBER	TITLE	FY1991 ACTUAL	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE CONT.	TOTAL PROGRAM CONT.
P0775	SSEP	4,439	18,785	22,951		

B. (U) DESCRIPTION: This program develops and improves Electronic Support Measures (ESM) techniques, components, equipment, and systems that will increase submarine operational effectiveness in the increasingly dense and sophisticated electromagnetic environment caused by the proliferation of complex communications, navigation, and radar equipment provided to potential adversaries. Improved threat warning, over-the-horizon targeting support (OTH-T) for submarine launched cruise missiles, and tactical surveillance/data collection are addressed. Due to FY89 Congressional direction, the AN/WLQ-4(V)1 Block Upgrade Program has been redirected to focus on the Integrated ESM Mast (IEM) and to initiate the Advanced Submarine Tactical ESM Combat System (ASTECS) Development Program. Specific efforts now include development of the: (1) IEM replaces the AN/BRD-7 and AN/BLD-1 Direction Finding Systems on the SSN-21 Submarine and is required for the new attack submarine, (2) the Improved Early Warning Receiver, (3) periscope and antenna radar cross section reduction (RCSR) kits to reduce vulnerability to detection by radar, and (4) the ASTECS that will provide the next generation ESM system for attack submarines. The ASTECS Program is a new start (ORD approved October 1991) that will transition from PE 0603522N in FY93 and is being developed to meet the enhanced threat signal environment and the space limitations expected in the new attack submarine.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Completed Demonstration and Validation of the Integrated ESM Mast (IEM) antenna system. Generated IEM acquisition documentation in preparation for Milestone II decision and Engineering and Manufacturing Development (EMD) contract.
- b. (U) Continued development of the Improved RCSR Radome for the AN/BRD-7 antenna.
- c. (U) Began development of an Improved Early Warning Receiver Field Change Kit (FCK) for Type 18 Periscopes on SSN-688 Class Submarines and the SSN-21.

2. (U) FY 1992 PROGRAM:

- a. (U) Obtain Milestone II approval and begin the EMD Phase of IEM.
- b. (U) Complete development of the Improved RCSR Radome.
- c. (U) Continue development of the Improved Early Warning Receiver.

3. (U) FY 1993 PLANS:

- a. (U) Continue the EMD phase of IEM.
- b. (U) Obtain Milestone I approval and begin the Demonstration and Validation Phase for ASTECS.
- c. (U) Complete development of the Improved EW Receiver.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604515N BUDGET ACTIVITY: 4
 PROGRAM ELEMENT TITLE: Submarine Support Equipment Program
 PROJECT NUMBER: F0775 PROJECT TITLE: Submarine Support Equipment Program

D. (U) WORK PERFORMED BY: IN-HOUSE: DTRC, Bethesda, MD; NUSC, New London, CT; NESEC, San Diego, CA. CONTRACTORS: GTE Government Systems, Mountain View, CA; Lockheed Sanders, Nashua, NH; Raytheon, Goleta, CA; Radant, Stow, MA; GEC-Marconi, San Diego, CA; ASTECS - TED.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: None.
2. (U) SCHEDULE CHANGES: EMD of IEM has slipped from FY 1990 to FY 1992 due to development problems during the Demonstration and Validation (Dem/Val) Phase. Dem/Val testing has now been satisfactorily completed.
3. (U) COST CHANGES: The \$4.8M reduction in FY 93 will limit the ASTECS program to one complete demonstration model (vice two models) during its DEM/VAL phase. To reduce the risk of this approach, two contractors will conduct risk reduction activities earlier in the DEM/VAL Phase.

F. (U) PROGRAM DOCUMENTATION:

IEM Operational Requirement	7/91
IEM Test and Evaluation Master Plan	2/92
IEM Integrated Program Summary	2/92
ASTECS Operational Requirements Document	10/91
ASTECS Test and Evaluation Master Plan	3/93
ASTECS Integrated Program Summary	3/93

G. (U) RELATED ACTIVITIES: PE 0603522N, Advanced Submarine Support Equipment Program; PE 0604561N, Project S1946, SSN-21 Development.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT:					
OPN LI# 80	0	1,646	3,179	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None

J. (U) MILESTONE SCHEDULE:

IEM Demonstration & Validation	FY 1988-1991
IEM Milestone II Decision	4/1992
IEM EMD Contract Award	5/1992
IEM Milestone IIA Decision	FY 1996
IEM Milestone III Decision	FY 1997
IEM IOC	FY 1999
ASTECS Concept Exploration & Definition Contract Award	7/1992
ASTECS Milestone I Decision	FY 1993
ASTECS Milestone II Decision	FY 1996
ASTECS Milestone IIA Decision	FY 2000
ASTECS Milestone III Decision	FY 2003
ASTECS IOC	FY 2004

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604516N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Ship Survivability

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1991 ACTUAL	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1828	Ship Survivability (Engineering)	1,355	1,365	1,556	CONT.	CONT.
S2054	Ship Damage Control	4,117	3,655	3,938	CONT.	CONT.
	TOTAL	5,472	5,020	5,494	CONT.	CONT.

B. (U) DESCRIPTION: This program supports the full scale development of equipment/systems to enable continued, effective combat missions through protection from weapons effects due to hostile actions and peace time accidents. This program also supports the engineering development of improved Damage Control/Fire Protection and Firefighting equipment, devices, and systems for rapid control/suppression of damage/fire with retention of ship mission.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604516N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Ship Survivability

PROJECT NUMBER: 81828

PROJECT TITLE: Ship Survivability (Engineering)

C. (U) DESCRIPTION: This project supports the full scale development of systems and components to provide protection from weapons effects, and to enable continued combat missions. Includes ship smoke control/exhaust to support uninterrupted mission operations, rapid firefighter response, and personnel egress; uninterruptible power for mission critical combat systems; camouflage paint schemes; and operational improvements to the Ship Vulnerability Model (SVM).

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Conducted evaluations of a Smoke Ejection System (SES) Main Space/DC Deck variant design.
- b. (U) Developed DDG-51 NAB design package for Main Space/DC Deck variant design.
- c. (U) Developed camouflage (visual) paint schemes for KNOX Class (FF-1052); quantified detectability of DDG-51 and LHD-5.

2. (U) FY 1992 PROGRAM:

- a. (U) Develop camouflage (visual) paint manual for surface ships; establish performance requirements for infrared (IR) paints.
- b. (U) Complete final SES documentation; complete engineering development of SES.
- c. (U) Initiate operational improvements to SVM.
- d. (U) Initiate engineering development of Navy Standard Electronic Power Supply (NSEPS); procure three units for environmental testing.

3. (U) FY 1993 PLANS:

- a. (U) Conduct camouflage IR paint tests.
- b. (U) Complete environmental testing of NSEPS.
- c. (U) Complete operational improvements to SVM.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: DTRC, Bethesda, MD; NRL, Washington, D.C.
CONTRACTORS: John J. McMullen Associates, Inc., Arlington, VA; Gibbs & Cox, Arlington, VA

F. (U) RELATED ACTIVITIES: P.E. 0603514N/S0384, (Ship Combat Survivability)

G. (U) OTHER APPROPRIATION FUNDS: Specification changes included in new construction ships (SCN funding). Procurement information not available at this level of detail.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1992/3 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604516N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Ship Survivability

PROJECT NUMBER: S2054

PROJECT TITLE: Ship Damage Control

C. (U) DESCRIPTION: This project supports the engineering development of improved damage control, fire protection and firefighting systems for rapid damage control and recovery for mission retention in a post hit situation.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Obtained Milestone III decision for Damage Control Wirefree Communications (DC WIFCOM) System (frigate/destroyer/cruiser type ships).

b. (U) Completed preparations for TECHEVAL of DC WIFCOM for large aircraft-capable ship types.

c. (U) Modified full scale test facility (ex-SHADWELL) to support the development of fleet firefighting doctrine for major conflagrations.

2. (U) FY 1992 PROGRAM:

a. (U) Complete TECHEVAL and OPEVAL of large ship DC WIFCOM; achieve Milestone III.

b. (U) Complete Non-Development Item (NDI) testing of a reliable diesel powered portable firefighting pump.

c. (U) Initiate short-term development of a prototype portable, two-hose pump engine that operates on both diesel fuel and JP-5.

d. (U) Initiate fire-tolerance testing of quick-acting watertight doors.

3. (U) FY 1993 PLANS:

a. (U) Complete all engineering, test and evaluation of NDI portable pump, and complete specification package for production contract.

b. (U) Complete construction and initiate testing of a two-hose portable pump engine.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, D.C.; DTRC, Bethesda, MD; NAVSSES, Philadelphia, PA; NSCSSES, Norfolk, VA. CONTRACTORS: Hale Fire Pump Company, Conshohocken, PA; Advanced Engine Design, Colgate, WI; Motorola, Fort Lauderdale, FL and Landover, MD; Loral Services, Norfolk, VA.

F. (U) RELATED ACTIVITIES: P.E. 0603514N - Project S1565 (Ship Damage Control for advanced development efforts).

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands):

	FY1991 ACTUAL	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT:					
(U) OPN COSAL Outfitting/#245	4,891	22,167	25,978	Cont.	Cont.
(U) OPN Fire Fighting/# 15 Equipment	31,000	29,800	28,900	Cont.	Cont.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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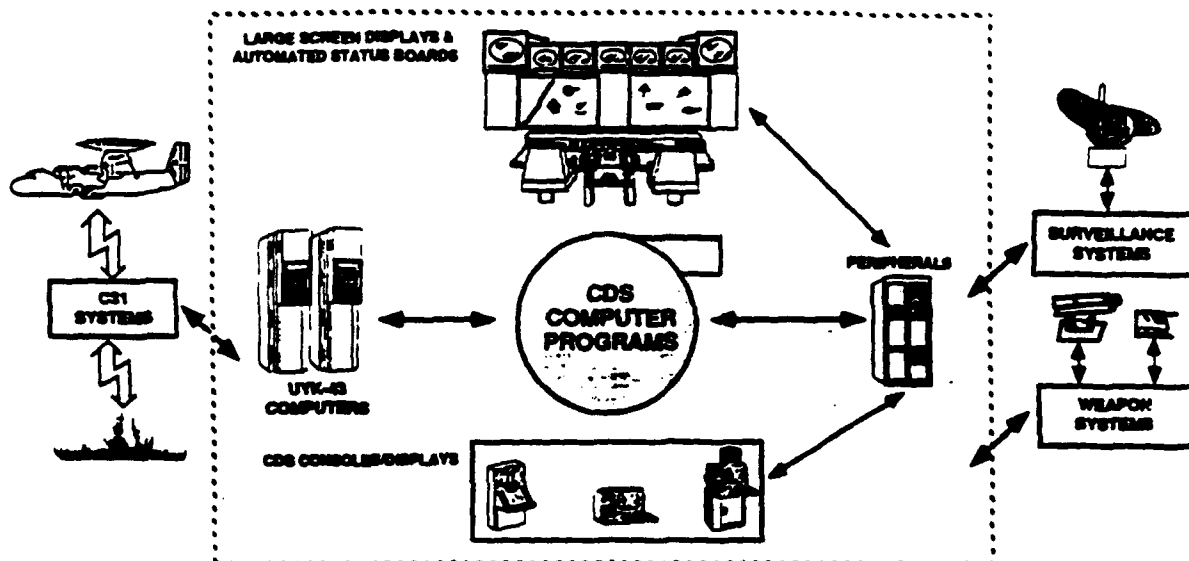
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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0604518N Budget Activity: 4
 Program Element Title: Combat Information Center Conversion
 Project Number: S1604 Project Title: Naval Tactical Data System (NTDS)
 Software Improvements



POPULAR NAME: Advanced Combat Direction System (ACDS) Block 1

A. (U) SCHEDULE/BUDGET INFORMATION:

SCHEDULE	FY 1991	FY 1992	FY 1993	To Complete
Program Milestones				MS III (3rd QTR FY98)
Engineering Milestones			TRR(SAT)	PQR(CV)
T&E Milestones			SAT(CV)	SAT(CV) CSIT(CV) OPEVAL (CV)
Contract Milestones				PQR(CV) Award Fee
BUDGET (\$K)	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
Major Contracts	13,744	5,303	10,470	Continuing Continuing
Support Contract	0	0	0	Continuing Continuing
In-House Support	3,778	1,948	3,768	Continuing Continuing
GPE/ Other	5,754	1,679	4,481	Continuing Continuing
Total	23,276	8,930	18,719	Continuing Continuing

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0604518N Budget Activity: 4
Program Element Title: Combat Information Center Conversion
Project Number: S1604 Project Title: Naval Tactical Data System
(NTDS) Software Improvements

B. (U) DESCRIPTION: This program element develops software that replaces 1960's vintage NTDS operating systems and applications algorithms and implements advanced concepts for Tactical Data System upgrades for surface ships in response to future threats, operational deficiencies, and new and existing operational requirements. The program's objective is to develop integrated, coherent ship's command and control systems that will increase operational capabilities; promote standardization and introduction of new shipboard tactical displays and support equipment; and provide integration between sensor/weapons systems which are organic to and outside the battle force. This program provides for significant Combat Direction System (CDS) improvements including implementation of the Joint Tactical Information Data System (JTIDS)/Tactical Data Information Link (TADIL) J (LINK 16) message standard to support interoperability/joint operations with U.S. Navy/Air Force/Marine and NATO forces; implementation of the Aegis Tactical Executive System (ATES); and integration and interface with the Command and Control Processor (C²P).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:

- a. (U) Completed code of the core elements of Advanced Combat Direction System (ACDS) Block 1 program.
- b. (U) Began contractor test on the core elements of ACDS Block 1 computer program.
- c. (U) Continued code on the remaining lead ship elements of ACDS Block 1 program.
- d. (U) Completed CDS Standard Simulation System development in support of ACDS Block 1 operational shore site testing.

2. (U) FY 1992 Program:

- a. (U) Continue contractor test on the core elements of ACDS Block 1 computer program.
- b. (U) Continue coding of the lead ship elements of ACDS Block 1 computer program.

3. (U) FY 1993 Plans:

- a. (U) Complete contractor test on the core elements of ACDS Block 1 computer program.
- b. (U) Complete coding of the lead ship elements of ACDS Block 1 computer program.
- c. (U) Begin contractor test on the remaining lead ship elements of ACDS Block 1 program.
- d. (U) Conduct Test Readiness Review (TRR) for System Acceptance Tests (SAT).
- e. (U) Write test procedures for Systems Acceptance Test (SAT).
- f. (U) Begin SAT on lead ship program.

4. (U) Program to completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN HOUSE: Naval Ocean Systems Center, San Diego, CA; Fleet Combat Direction Systems Support Activity, San Diego, CA; Integrated Combat System Test Facility, San Diego, CA; and Puget Sound Naval Shipyard, Bremerton, WA.

CONTRACTORS: Hughes Aircraft Co., San Diego, CA; QuesTech Inc., San Diego, CA; UNISYS, St Paul, MN.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0604518N Budget Activity: 4
Program Element Title: Combat Information Center Conversion
Project Number: S1604 Project Title: Naval Tactical Data System (NTDS)
Software Improvements

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: None
2. (U) SCHEDULE CHANGES: Test Readiness Review (TRR) for SAT deferred to FY93 to reflect FY92 funding adjustment.
3. (U) COST CHANGES: FY93 funding increase of \$4.5M associated with scheduled change.

F. (U) PROGRAM DOCUMENTATION:

- (U) DCP - 22 Aug 89
- (U) TEMP #935 - Approved 15 Dec 88

G. (U) RELATED ACTIVITIES:

- (U) PE 0603228N, CV ASW Module
- (U) PE 0603582N, Combat System Integration
- (U) PE 0205604N, JTIDS
- (U) PE 0603717N, C/P

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) TEST AND EVALUATION: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604524N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Submarine Combat Systems

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1991 ACTUAL	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
F1347	AN/BSY-1	2,066	0	0	0	952,136
N1941	AN/BSY-2	<u>331,985</u>	<u>264,270</u>	<u>0*</u>	<u>0*</u>	<u>0</u>
	TOTAL	334,051	264,270	0	0	0

B. (U) DESCRIPTION: This program element encompasses the development of submarine combat systems for both SSN 688 Class and the SSN 21. The AN/BSY-1 Combat Control and Acoustic (CC/A) Subsystem will be installed in new construction submarines SSN 751 through 773. AN/BSY-1 replaces the AN/BQQ-5 Sonar and CCS MKI Combat System. AN/BSY-1 provides capabilities for detection, classification, tracking, target motion analysis, onboard training, vertical launch of weapons, under-ice operations, and increased acoustic performance over previous SSN 688 Class systems. AN/BSY-1 successfully completed OPEVAL during 1991 and is essentially completed. Advances in performance by modern Soviet submarine designs eroded the margin of qualitative superiority of U.S. submarines. Despite the current state of affairs in the C.I.S., these very capable submarines remain in the active fleet inventory and will be in the majority of their submarine fleet in the year 2000. In order to counter this trend, the Chief of Naval Operations established the SSN 21 SEAWOLF and the AN/BSY-2 Combat System Top Level Requirements. The development objectives for AN/BSY-2 were to: meet the SEAWOLF combat system related Top Level Requirements; develop an architecture which facilitates tactical improvements and future growth; and provide computer processes that improve response time from initial threat detection to weapon launch. AN/BSY-2 was designed to provide new acoustic arrays which would have improved self-noise characteristics and improved detection performance. It would provide computer aids to assist the operator in sensor, contact and weapon management, and would support employment of the most advanced submarine weapons from eight torpedo tubes. Software development is being conducted by dividing the total software into six Threads to be built and tested in phases throughout the development. The system architecture is partitioned to facilitate tactical improvements, future growth, and high availability.

* Funding requirements necessary to complete the SSN-21 lead ship are under review.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604524N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Submarine Combat Systems
PROJECT NUMBER: N1941 PROJECT TITLE: AN/BSY-2

A. Resources (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
TOTAL	331,985	264,270	0	0	0

B. (U) DESCRIPTION: The Soviets made significant advances in submarine platform quieting and combat system performance. As a result, projected exchange ratios have shown a continual decline since the 1960s. In order to counter this capability, the Chief of Naval Operations established the SSN 21 SEAWOLF and the AN/BSY-2 Combat System Top Level Requirements. The development objectives for AN/BSY-2 were: Meet the SEAWOLF combat system related Top Level Requirements; develop an architecture which facilitated tactical improvements and future growth; and provide computer processes that improve response time from initial threat detection to weapon launch. AN/BSY-2 would provide new acoustic arrays with improved self-noise characteristics and improved detection performance. It provided computer aids to assist the operator in sensor, contact and weapon management, and supports employment of the most advanced submarine weapons from eight torpedo tubes. Software development was being conducted by dividing the total software into six Threads to be built and tested in phases throughout the development. The system architecture is partitioned to facilitate tactical improvements, future growth, and high availability.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- (U) Conducted Maintenance Trainer Preliminary Design Review (PDR)
- (U) Completed Critical Item Tests (FLEXNET performance)
- (U) Conducted Follower Production Readiness Reviews (PRR)
- (U) Awarded Team Trainer Unique Equipment contract
- (U) Exercised limited production options for AN/BSY-2 systems
- (U) Completed WAA hardware assembly and unit test
- (U) Conducted Thread 1 demonstration
- (U) Delivered Wide Aperture Array for Shock Test
- (U) Conducted spherical array Outboard Electronics (OSE) Shock

Test

2. (U) FY 1992 PROGRAM: Procurement of additional submarines beyond SSN-21 has been terminated therefore funding for this project was terminated. Determination of costs to complete the lead ship combat system is ongoing. Funds are being used to complete BSY-2 development. Exact breakout of plans is somewhat dependent on the ongoing review of lead ship close out costs.

3. (U) FY 1993 PLANS: Procurement of additional submarines beyond SSN-21 has been terminated therefore funding for this project was terminated. Determination of costs to complete the lead ship combat system is ongoing.

4. (U) Program to Completion: Although the program has been terminated, lead ship development costs are under review.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

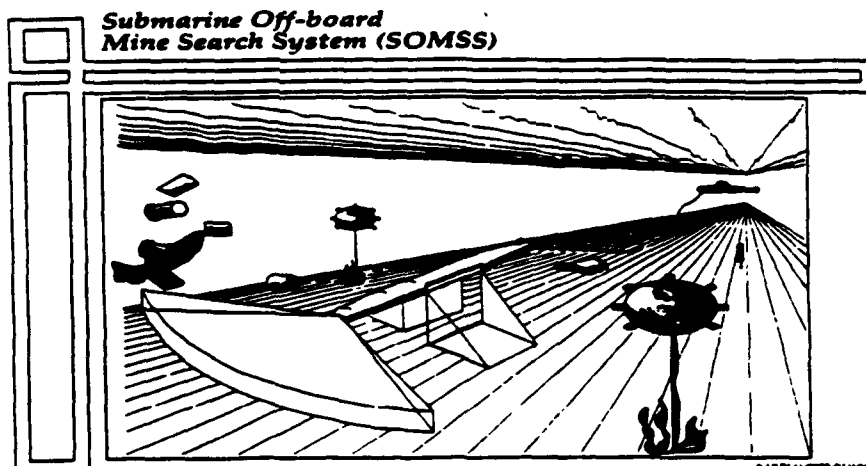
PROGRAM ELEMENT: 0604559N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Deep Submergence Technology

PROJECT NUMBER: F2094

PROJECT TITLE: Unmanned Undersea Vehicle



POPULAR NAME: Submarine Off-board Mine Search System (SOMSS)

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	TO COMPLETE
PROGRAM MILESTONES	TRANSITION T&E FROM DARPA: JAN 1991	SOMSS MS I: SEP 1992	--	SOMSS MS II: FY 1997
ENGINEERING MILESTONES	CONDUCT SOMSS CONCEPT EXP.	SOMSS CONCEPT DESIGN: SEP 1992		
T&E MILESTONES		COMMENCE DARPA MSS T&E: MAR 1992	COMPLETE DARPA MSS T&E: SEP 1993	
CONTRACT MILESTONES			COMPLETE SOMSS DEV CONTRACTS	AWARD SOMSS DEV CONTRACTS: FY 1994
BUDGET (\$K)	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
MAJOR CONTRACT	0	12,000	14,000	Continuing
SUPPORT CONTRACT	0	6,000	3,000	Continuing
IN-HOUSE SUPPORT	0	5,244	4,085	Continuing
GFE/OTHER				
TOTAL	0 *	23,244	21,085	Continuing

(U) * FY 1991 Navy funding of \$11,288K for the joint UUV program came from PE 0603561N S2033, which also addresses other Advanced Submarine Technology efforts. PE 0604559N S2094 was established to provide the UUV effort with its own distinct accountability and management.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604559N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Deep Submergence Technology

PROJECT NUMBER: F2094

PROJECT TITLE: Unmanned Undersea Vehicle

B. (U) DESCRIPTION: This Program Element supports a Memorandum of Agreement (MOA) signed on 29 July 1988 by the Navy (ASN RE&S) and the Defense Advanced Research Project Agency (DARPA) for the conduct of a Joint Unmanned Undersea Vehicle (UUV) Prototype Program. This element further supports follow-on Navy acquisition program developments including a Tactical Acoustic System (TAS) (classified mission), and a Mine Search System (MSS) to provide a semi-autonomous mine avoidance capability to guide a submarine through a mine field.

(U) DARPA's responsibilities are to develop and demonstrate the UUV prototype systems and technologies, and then transition them to the Navy; these DARPA efforts are currently funded by PE 0603226E. The Navy's responsibilities in the joint program are to provide DARPA with 25 percent of the required UUV prototype funding and to establish Navy programs to transition UUV systems and technologies toward appropriate acquisition milestones.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) DARPA: Completed test and evaluation of TAS in December 1990 and successfully transitioned it to the Navy. The Navy then conducted additional testing between January and May 1991 to make an initial assessment of the system's technical realism in an operational environment (with Fleet assets) and to determine the extent of additional development requirements prior to a milestone decision. These tests successfully demonstrated the system's realism and that minimal development work would be required prior to full-scale or engineering and manufacturing development.

(U) DARPA Completed the MSS prototype design, with the Critical Design Review being held in May 1991.

b. (U) Navy: Concept exploration studies were commenced in December 1990 to more fully assess the Navy's operational requirements and system development tradeoffs for this submarine mine avoidance UUV system.

2. (U) FY 1992 PROGRAM:

a. (U) DARPA: Complete MSS prototype development and commence test and evaluation in mid FY 1992, which will continue through FY 1993.

b. (U) Navy: CNO reassessed the changing TAS and MSS threats and mission priorities. Result, was to terminate further TAS development and to focus UUV resources on the development of a Submarine Off-board Mine Search System (SOMSS). This system would be initially designed for launch and recovery (L&R) via standard 21" torpedo tubes on SSN 688/688 I class submarines. OP-02 recognized the technical success of the TAS efforts and, therefore, also directed that these efforts be properly documented to allow for future development should the threat reemerge.

(U) The Navy's FY 1992 program will, therefore, consist of documenting the TAS efforts, and completing SOMSS Concept Exploration and Definition and proceeding toward a Milestone I decision at the end of the fiscal year. Using information from the DARPA MSS efforts and from the Navy's concept exploration studies which commenced in FY 1991, a SOMSS Conceptual System Design will be developed. Subsystem technical exploration in FY 1992 will focus on UUV-submarine interface issues (particularly L&R) not being addressed by DARPA. Acquisition documentation required by DODDIR 5000.1 and DODINST 5000.2 for a Milestone I decision will be developed.

3. (U) FY 1993 PLANS:

a. (U) DARPA: Complete MSS prototype test and evaluation and complete transition of prototype technologies to the Navy SOMSS program.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604559N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Deep Submergence Technology

PROJECT NUMBER: F2094

PROJECT TITLE: Unmanned Undersea Vehicle

b. (U) Navy: After completing a Milestone I decision, the SOMSS Demonstration and Validation (D&V) phase will commence. This D&V phase will be executed in accordance with the SOMSS System Development Plan and Acquisition Strategy currently under development. The focus of the initial development work and major contracts will be in the area of tactical UUV launch and recovery from a submarine. Specifications for the SOMSS will be developed and the source selection process completed for major contract awards in FY 1994.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NUSC, Newport, RI; DTRC, Carderock, MD; NAVCOASTSYSCEN, Panama City, FL; NAVUSEAWARENGSTA, Keyport, WA. CONTRACTORS: Applied Physics Laboratory/Johns Hopkins University, Laurel, MD; C.S. Draper Laboratory, Cambridge, MA; various competitive contracts.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: TAS effort is being terminated in FY 1992; program focused on SOMSS.

2. (U) SCHEDULE CHANGES: TAS milestones removed. SOMSS milestones updated to reflect more realistic schedule (including development of submarine interface subsystems not addressed by DARPA) and to reflect DODINST 5000.2 procedures.

3. (U) COST CHANGES: None.

F. (U) PROGRAM DOCUMENTATION:

1. (U) Memorandum of Agreement, Unmanned Undersea Vehicle Prototype Program, signed 29 July 1988 by DARPA and ASN (REES).

2. (U) Tentative Operational Requirement (TOR) for Submarine Mine Countermeasures, dated 21 May 1986. This document will be replaced by the Operational Requirements Document for the Submarine Offboard Mine Search System (SOMSS), currently in the CNO review and promulgation cycle.

G. (U) RELATED ACTIVITIES: FE 0603226E, Experimental Evaluation of Major Innovative Technologies: The DARPA portion of the joint UUV program, as described in paragraph B of this RDDS, is funded by Project EE-39 of this Program Element.

H. (U) OTHER APPROPRIATION FUNDS: None.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

J. (U) TEST AND EVALUATION (T&E):

1. (U) TAS T&E was successfully completed in FY 1991, as described in paragraph C.1.a.

2. (U) DARPA will commence MSS testing starting in mid FY 1992 and continuing through FY 1993.

3. (U) SOMSS T&E requirements will be established in the Test and Evaluation Master Plan (TEMP), currently being developed for Milestone I.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604561N BUDGET ACTIVITY: 4-Tactical Programs
 PROGRAM ELEMENT TITLE: SSN 21 Development
 PROJECT NUMBER: W1946 PROJECT TITLE: SSN 21 Development



Popular Name: SEAWOLF R&D Program

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	TO COMPLETE
PROGRAM	OSD PROGRAM			
MILESTONES	REVIEW			
ENGINEERING	FY91-SUBMARINE LAUNCH TEST UNIT CONSTRUCTED			
MILESTONES	FY92-IPMP II TESTING COMPLETE, ATP TESTING COMPLETE			
T&E	DT-II	DT-II		
MILESTONES	OT-II	OT-II		
CONTRACT			T&D	
MILESTONES			T&D	
BUDGET (\$K)	FY 1991	FY 1992	FY 1993*	PROGRAM TOTAL TO COMPLETE *
MAJOR	80,643	45,848	0	0
CONTRACT				0
SUPPORT	3,736	2,530	0	0
CONTRACT				0
IN-HOUSE	89,953	77,153	0	0
SUPPORT				0
GFE/	13,088	30,159	0	0
OTHER				0
TOTAL	187,420	155,690	0	0

* Funding requirements necessary to complete the SSN-21 lead ship are under review.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604561N BUDGET ACTIVITY: 4-Tactical Programs
PROGRAM ELEMENT TITLE: SSN 21 Development
PROJECT NUMBER: N1946 PROJECT TITLE: SSN 21 Development

B. (U) DESCRIPTION: The SSN 21 multi-mission submarine will be quiet, fast, heavily armed, survivable, and capable of contending with the projected enemy threat well into the 21st century. The program provides the advanced technology, prototype components and systems to design and construct the lead ship, SSN 21, using cost effective modular construction techniques. This program includes cost reduction efforts, producibility initiatives and technical risk reduction initiatives. Significant technical advances in areas such as silencing, survivability, depth, speed and combat system integration are also included.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS: The following information is intended to highlight major R&D efforts and does not include all SEAWOLF R&D efforts.

1. (U) FY 1991 ACCOMPLISHMENTS:

- a.(U) Completed land based testing of propulsion shaft thrust bearing/vibration reducer.
- b.(U) Completed manufacture of Ship Service Turbine Generator II (SSTG II) shock test unit.
- c.(U) Commenced land based testing on Improved Performance Machinery Program (IPMP II) Main Propulsion Unit (MPU) complex.
- d.(U) Continued prototype propulsor fabrication.
- e.(U) Continued development of
- f.(U) Performed hydrodynamic model tests to update maneuvering estimates for the
- g.(U) Finalized Advanced Special Hull Treatment (ASHT) coating scheme.
- h.(U) Started fabrication of SSN 21 prototype battery and continued Advanced Submarine Battery (ASB-III) qualification testing. Completed evaluation of prototype Automatic Battery Monitor System (ABMS).
- i.(U) Completed fabrication of 155V DC prototype.
- j.(U) Commenced land based testing of a prototype Air Turbine Pump (ATP) torpedo ejection system.
- k.(U) Completed construction of advance submarine launch test unit.
- l.(U) Commenced construction of Underwater Explosion Test Facility (UTF) at Aberdeen Proving Ground.
- m.(U) Continued shock qualification tests of SSN 21 items.
- n.(U) Commenced resolution of the High Yield - 100 (HY-100) weld issue.

2. (U) FY 1992 PROGRAM:

- a.(U) Complete land based testing on MPU.
- b.(U) Commence at-sea testing of partial arc propulsion shaft bearing.
- c.(U) Continue prototype full scale propulsor fabrication.
- d.(U) Complete development of
- e.(U) Complete ASHT material certification tests.
- f.(U) Complete fabrication of SSN 21 prototype battery and complete ASB-III qualification testing.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604561N BUDGET ACTIVITY: 4-Tactical Programs
PROGRAM ELEMENT TITLE: SSN 21 Development
PROJECT NUMBER: N1946 PROJECT TITLE: SSN 21 Development

- g.(U) Fabricate SSN 21 qualification battery cells.
- h.(U) Commence at-sea test of high pressure air compressor.
- i.(U) Complete design and fabrication of quiet air reducing manifolds.
- j.(U) Complete qualification tests of trim and drain pump.
- k.(U) Complete seawater system development.
- l.(U) Complete qualification testing of prototype R-114 air conditioning unit.
- m.(U) Commence qualification testing of 155V DC power supply prototype.
- n.(U) Continue at-sea testing of Impressed Current Cathodic Protection (ICCP) system.
- o.(U) Complete prototype ATP testing.
- p.(U) Continue construction of UTP.
- q.(U) Continue shock qualification tests of SSN 21 items.
- r.(U) Complete evaluation of self noise requirements.
- s.(U) Continue foundation acoustic design validation.
- t.(U) Continue development of noise vibration monitoring system.
- u.(U) Complete Ship Control System (SCS) prototype fabrication and commence hardware/software integration testing.
- v.(U) Continue HY-130 certification program.
- w.(U) Complete resolution of HY-100 weld issue.

3. (U) FY 1993 Plans:

a.(U) Procurement of additional submarines beyond submarine number SSN-21 has been terminated due to decreased Soviet threat, therefore, this project has been terminated. Determination of lead ship development costs is ongoing.

4. (U) Program to Completion: Although the program has been terminated, lead ship development cost are under review.

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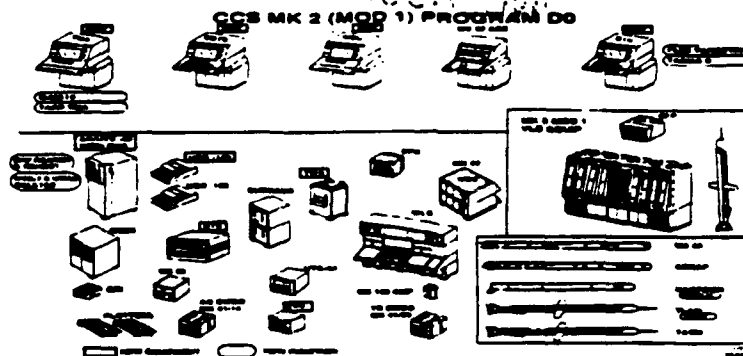
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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604562N BUDGET ACTIVITY: 4
 PROGRAM ELEMENT TITLE: Submarine Tactical Warfare System
 PROJECT NUMBER: P0236 PROJECT TITLE: SSN Combat Control System Improvement (Engineering)



POPULAR NAME: CCSIP

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	TO COMPLETE
PROGRAM MILESTONES				
Program C4.2		2/92; RTF		
Program C4.2 Rev 1	10/90; AWARD			1Q/FY94; RTF
MK 2 (D0 Software)				4Q/FY94; MSIII
MK 2 FOLLOW-ON (D1 Software)				4Q/FY94; MSII
ENGINEERING MILESTONES				
C4.2 Rev 1	9/91, CDR		2/93; SDCT	
MK 2	12/90, CDR (MK 2 Mod 0/1) 8/91, PDR (MK 2 Mod 2)	11/91, CDR (MK 2 Mod 2) 8/92, SDCT (MK 2 Mod 0/1)		
T&E MILESTONES				
C4.2	7/91, OPEVAL			
C4.2 Rev 1			3/93, CERT 4/93, TECHEVAL 6/93, OPEVAL 8/93, D0 TECHEVAL 12/93, D0 OPEVAL	
MK 2				
MK 2 FOLLOW-ON (D1 SOFTWARE)				1Q/98; TECHEVAL 2Q/98; OPEVAL
SCHEDULE	FY 1991	FY 1992	FY 1993	TO COMPLETE
CONTRACT MILESTONES				
MK 82 Weapon Data Converter	05/92 Award			
MK 2 FOLLOW-ON (D1 Software)				7/94 Award
BUDGET (\$K)	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
MAJOR CONTRACT SUPPORT				
CONTRACT	55200	51417	39896	CONTINUING
IN-HOUSE SUPPORT				
CONTRACT	2440	3116	586	CONTINUING
IN-HOUSE				
SUPPORT	16060	16160	22308	CONTINUING
GFE/OTHER	233	7590	2592	CONTINUING
TOTAL:	73933	78283	65382	CONTINUING

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604562N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Submarine Tactical Warfare System

PROJECT NUMBER: F0236 PROJECT TITLE: SSN Combat Control System Improvement (Engineering)

B. (U) DESCRIPTION: This program counters the evolving threat by supporting engineering development to integrate improved weapons capabilities within the submarine Combat Control System (CCS) Mk 1, Mk 2, AN/BSY-1 (Combat Control (CC)), and Mk 117 Fire Control System. The primary thrust of the Combat Control System Improvement Program (CCSIP) is the development and introduction of the CCS Mk 2 Combat Control System. CCS Mk 2 is an evolutionary program that, in conjunction with the AN/SQQ-5E Sonar Suite, will provide for a functionally equivalent combat system onboard SSN 688 Class, SSN 751 Flight (AN/BSY-1 Platforms), and SSBN 726 Class (TRIDENT) submarines. The CCS Mk 2 program makes maximum use of Navy Standards and non-developmental items and replaces obsolete equipment which is no longer in production or has become increasingly difficult to maintain. Follow-on Mk 2 efforts (Program D1) provide enhanced weapons deployment capabilities and rapid software update procedures.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Initiated development of Program D1 specifications and related documentation to support competitive procurement.
- b. (U) Conducted Critical Design Review (CDR) for CCS Mk 2 Mods 0/1 Program D Software.
- c. (U) Completed Preliminary Design Review (PDR) for CCS Mk 2 Mod 2 Program D Software.
- d. (U) Awarded Program C4.2 Rev 1 contract to incorporate TOMAHAWK Block III into CCS Mk 1.
- e. (U) Completed CDR for C4.2 Rev 1.
- f. (U) Initiated the Development of Weapon Data Converter specification and related documentation to support competitive procurement.
- g. (U) Successfully completed OPEVAL for CCS Mk 1 Program C4.2.

2. (U) FY 1992 PROGRAM:

- a. (U) Initiate system design certification test (SDCT) for CCS Mk 2 Mod 0/1 Variants (SSN 688, VLS & Non-VLS).
- b. (U) Complete Design Definition, for initial Mk 2 Follow-On Effort (Program D1).
- c. (U) Conduct CDR for CCS Mk 2 Mod 2 Program D software.
- d. (U) Release Program C4.2 to Fleet.
- e. (U) Award Weapon Data Converter Contract.
- f. (U) Award contract modification for S/W development and integration of TOMAHAWK Block III into AN/BSY-1
- g. (U) Award contract modification for S/W development and integration of TOMAHAWK Block III, Harpoon 1C and operability improvements into CCS Mk 2 Program D.

3. (U) FY 1993 PLANS:

- a. (U) Complete TECHEVAL/start OPEVAL for CCS Mk 2 (Mods 0/1).
- b. (U) Complete SDCT for Mk 2 Mod 2.
- c. (U) Complete CERT for C4.2 Rev 1.
- d. (U) Complete TECHEVAL/OPEVAL for C4.2 Rev 1.
- e. (U) Complete SDCT of TOMAHAWK Block III S/W for AN/BSY-1
- f. (U) Complete SDCT and Government CERT for TOMAHAWK Block III, Harpoon 1C and operability improvements in CCS Mk 2 Program D.
- g. (U) Initiate adding significant weapon upgrades to Mods 0/1 (D/O baseline).

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604562N BUDGET ACTIVITY: 4
 PROGRAM ELEMENT TITLE: Submarine Tactical Warfare System
 PROJECT NUMBER: FO236 PROJECT TITLE: SSN Combat Control System Improvement
 (Engineering)

D. (U) WORK PERFORMED BY: IN-HOUSE: PEO-SCWS (PMO409), Washington, DC; COMOPTEVFOR Norfolk, VA; NUSC, Newport, RI; Naval Undersea Warfare Engineering Station, Keyport, WA; Naval Sea Combat System Engineering Station, Norfolk, VA; NOSC, San Diego, CA; Naval Weapon Support Center, Crane, IN. CONTRACTORS: UNISYS, St. Paul, MN; Raytheon, Portsmouth, RI; Lockheed, Austin, TX; LORAL Corporation, Akron, OH; EG&G Washington Analytical Services, Inc., Rockville, MD.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNICAL CHANGES: Existing C4.2 contract was modified to incorporate TOMAHAWK Block III into the CCS Mk 1 and AN/BSY-1 programs as directed by CNO. CCS Mk 2 Program D0 modified to incorporate TOMAHAWK Block III and Harpoon 1C and operability improvements (PCAD approved by ASN RDA 22 Aug 91).

2. (U) SCHEDULE CHANGES: CCS Mk 2 D0 MSIII and TECHEVAL/OPEVAL milestones slipped due to changes in the ship yard availability dates. C4.2 Release to Fleet slipped to Feb 1992 because of delays in passing OPEVAL. Program D1 MSII changed as a result of change in program D0 MSIII. New start Weapon Data Converter development initiated.

3. (U) COST CHANGES: RDT&E net increase of \$1.5M in FY 93 was applied to Program C4.2 Rev 1 and to incorporate TOMAHAWK Block III into AN/BSY-1.

F. (U) PROGRAM DOCUMENTATION:

OR (SO236)	11/88 (CCS Mk2)
NDCP (SO236-05)	9/88 (CCS Mk 2)
NDCP (SO236-AS)	12/87 (Programs C4 and C5)
NDCP (SO236-04)	8/89 (Program C4.1 MS III)
AP-111-87	9/87 (CCS Mk 2)
TEMP 234-9	9/88 (CCS Mk 2)
TEMP 234-8	7/90 (Program C4.2)
AP-89-025 (Rev 2 (91))	8/91 (CCS Mk 2 Program D1/Mk 82)

G. (U) RELATED ACTIVITIES:

1. (U) WEAPONS: P.E. 0604367N, TOMAHAWK - Theater Mission Planning Center; P.E. 0603691N, MK 48 ADCAP - Adv Dev; P.E. 0604601N, Mine Development; and P.E. 0604370N, SSN 688 Class Vertical Launch System.

2. (U) SENSORS: P.E. 0604707N, Theater Mission Plan Center; P.E. 0603708N, ASW Signal Processing; P.E. 0604503N, Submarine Sonar Development; P.E. 0604502N, Submarine Communications; and P.E. 0603504N, Advanced Submarine ASW Development.

3. (U) OTHER: P.E. 0604524N, Submarine Combat System - to minimize duplicate work and maximize operational and logistic commonality, CCS Mk 1 hardware and software components are used in the Combat Control Subsystem of AN/BSY-1.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN 187	61,574	55,165	65,066	CONT.	CONT.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) TEST AND EVALUATION: Failed initial C4.2 OPEVAL 8/90 due to unsatisfactory software reliability. C4.2 OPEVAL conducted again 7/91 with satisfactory results.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604567M

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Ship Subsystem Development/Land Base Test Site

PROJECT NUMBER: S1803 PROJECT TITLE: Ship Contract Design

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1803	Ship Contract Design	28,828	21,915	34,224	CONT.	CONT.

B. (U) DESCRIPTION: This program performs the engineering development (preliminary and contract design) of contractual documentation for the acquisition of ships in the Navy's Shipbuilding Program. All ship acquisitions require pre-award design planning. The end product of this Project is the technical and contractual definition of the ship design (e.g., ship specifications and drawings), with sufficient details for the prospective shipbuilder to make a sound estimate of construction cost and schedule. This program also provides design tools which support the development of Contract Design and production transition; and ship affordability studies.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Began contract design for TAGSO(SW) and Ship Fiber Optics Topology; and started trade-off studies for CVN-76, DDV and ARS(V).

b. (U) Continued DDG 51 FLT II, AGOR-24, CRAFT, TAGOS-23(SW-A), TAGSO(ICE), AOE-10 contract design; Specification Improvement Program and Designing for Production Program.

c. (U) Completed LHD-5 contract design, ARS(V) trade off studies and Phase I development of Electromagnetic Engineering (EMENG) design tools.

d. (U) Stopped MHC(V) contract design

2. (U) FY 1992 PROGRAM:

a. (U) Begin CVN-76 contract design and MHC(V)/MCS(X) trade-off studies.

b. (U) Continue CRAFT, TAGOS-23(SW-A), Designing for Production Program, and Specification Improvement program.

c. (U) Complete AGOR-24, AOE-9, DDG-51 FLT II contract design; Fiber Optics Topology Program; and CVN-76, DDV and MHC(V)/MCS(X) trade-off studies.

d. (U) Stop work on TAGSO(ICE) and plan to limit work on TAGSO(SW) to draft specification.

3. (U) FY 1993 PLANS:

a. (U) Begin L(X) and AR(X) preliminary design; MHC(V)/MCS(X) and TAGS 60+ contract design.

b. (U) Continue CVN-76 contract design, TAGOS-23(SW-A), CRAFT, Specification Improvement Program and Designing for Production.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604567N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Ship Subsystem Development/Land Base Test Site

PROJECT NUMBER: S1803 PROJECT TITLE: Ship Contract Design

D. (U) WORK PERFORMED BY: IN-HOUSE: Naval Ship Systems Engineering Station, Phila., Pa., David Taylor Research and Development Center, Bethesda, Md.
CONTRACTORS: JJMA, Inc., Arlington, Va., Advanced Marine Enterprises, Arlington, Va., Vitro Laboratories, Silver Spring, Md., Bath Iron works, Bath, Me., Gibbs & Cox, New York, NY..

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not Applicable.
2. (U) SCHEDULE CHANGES: Not Applicable.
3. (U) COST CHANGES: Reduction of \$1276K in FY 1993 associated with pricing adjustments for inflation and DBOF rates.

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

G. (U) RELATED ACTIVITIES: Program Element 0603564N, Ship Development (Adv).

H. (U) OTHER APPROPRIATED FUNDS: Not Applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE:

SHIP

FISCAL YEAR OF AWARD

LHD-5
AOE-9, AGOR-24, DDG-51 FLTH
TAGOS-23(SW-A)
MCS(X)(conversion)
L(X), CVN-76, TAGS-60+

FY 1991
FY 1992
FY 1994
FY 1994
FY 1995

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604574N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Navy Tactical Computer Resources

A. (U) RESOURCES (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1353	Standard Hardware					
		9,623	8,366	7,514	CONT.	CONT.
X0911	Computer Security					
		2,083	3,076	3,097	CONT.	CONT.
X1976	NGC	11,974	19,197	23,715	CONT.	CONT.
W0845	AN/AYK-14	5,571	5,611	2,192	CONT.	CONT.
	TOTAL	29,251	36,250	36,518	CONT.	CONT.

B. (U) DESCRIPTION: Navy Tactical Computer Resources include computers, display systems, peripherals, and associated software. These equipments are not stand-alone units. Rather, they are integral building blocks of larger weapons, sensor, and C3I systems. By requiring Navy large systems to use standard computer resources, we avoid many of the interoperability, logistics support, documentation and training problems throughout the life of the systems in the Fleet. This program provides the technical planning and engineering support for development and evolution of the Navy's high performance embedded computer resources. The program includes product improvement of current generation computers AN/AYK-14, AN/UYK-43 and AN/UYK-44; development of state-of-the-art mass memory storage devices (MMSD); computer security products; and development of interconnects, interfaces, protocols, and standards (hardware and software) needed for the highly flexible architectures of the Navy's next generation computer resource family.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

Program Element: 0604574N Budget Activity: 4
Program Element Title: Navy Tactical Computer Resources
Project Number: S1353 Project Title: Standard Hardware Systems

C. (U) DESCRIPTION: Planning and support for development and evolution of the Navy's high performance embedded computer resources.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Complete UYK-43 High Performance Processor (HPP) design and layout; productize UYK-43 Time Critical Subfunction and Embedded Memory Subsystem and begin production deliveries; took delivery of advanced development model UYK-44 Enhanced Processor (EP) on Variable Modular European (VME) and Standard Electronic Modules; witnessed Mass Memory Storage Device (MMSD) contractor qualification testing and develop documentation for MS IIA review and approval; developed enhanced MMSD Native Mode command set; completed draft display requirements document; balance of display program on hold.

2. (U) FY 1992 PROGRAM: Productize UYK-43 HPP and High Bandwidth Memory (HEM); begin implementation of UYK-43/44 open architecture; develop UYK-44 bus to VME bus bridge; demonstrate VME card cage in MRC; continue witness of MMSD contractor qualification and conduct independent government testing of MMSD; obtain MMSD MS IIA approval; define a SAFENET II Local Area Network (LAN).

3. (U) FY 1993 PLANS: Place UYK-43 HPP and HEM into production and investigate higher performance processor and I/O capability; productize UYK-44 bus to VME bridge; develop UYK-44 bus to Futurebus+ bridge; repackage VME UYK-44 to Futurebus+; productize UYK-43/44 open architecture; investigate and develop SPECS and SOW for next generation peripheral development; obtain MMSD MS III approval; productize a SAFENET II LAN; develop color workstation specs/tech data package for competitive procurement and generate source selection plans and initiate color workstation proposal review.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NADC, Warminster, PA; NAC, Indianapolis, IN; FCDSSA, San Diego, CA; FCDSSA, Dam Neck, VA; NSCSIS, Norfolk, VA; NESEA, St. Inigoes, MD; NSWCC, Crane, IN; NOSC, San Diego, CA; NUSC, Newport, RI; NSWC, Dahlgren, VA; CONTRACTORS: Paramax, St. Paul MN; Control Data Corporation, Minneapolis, MN; Johns Hopkins University/Applied Physics Laboratory, Laurel, MD; Microlithics, Golden, CO; Integrated Systems Analysts, Arlington, VA.

F. (U) RELATED ACTIVITIES: All Navy non-avionic programs using MTCR, including: PE 0603318N Advanced Surface-to-Air Missile; PE 0603503N Surface Mine Countermeasures; PE 0604301N MK92 Firecontrol System; PE 0604361N NATO Seasparrow; PE 0604372N New Threat Upgrade; PE 0604507N Navy Standard Signal Processors.

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604574N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Navy Tactical Computer Resources

PROJECT NUMBER: X0911 PROJECT TITLE: Computer Security

C. (U) DESCRIPTION: Project, in cooperation with industry, develops necessary capabilities to establish secure computing environments including multi-level security (MLS) in Navy systems. Project supports the following objectives to: (1) perform experienced-based development and evaluation of security relevant methods and tools (including those for integration, composability, and formal system certification), (2) assess state-of-the-art trusted products and components in a system context, and (3) apply the methods and incorporate the trusted products and components in high-interest Navy systems such as the Operational Support System (OSS) and the Trusted Submarine Message Buffer (TSMB). Project also provides for the evolution of the Certification and Information Security (INFOSEC) Engineering Laboratory (CIEL) which facilitates the accomplishment of the project objectives.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) **FY 1991 ACCOMPLISHMENTS:**
 - a. (U) Procured initial CIEL hardware/software and trusted products/components and prepared the physical plant.
 - b. (U) Investigated local area network (LAN) and operating system security issues, services, placements, and mechanisms.
 - c. (U) Completed annual report on investigations of common functional blocks, integration techniques and secure system integration guidelines. Performed security engineering for the TSMB design.
2. (U) **FY 1992 PROGRAM:**
 - a. (U) Perform installation and establish CIELb.
 - b. (U) Procure additional CIEL trusted products and components.
 - c. (U) Demonstrate CIEL trusted product interoperability.
 - d. (U) Perform post-IOC CIEL enhancements.
 - e. (U) Complete OSS Phase I (MLS LAN and Trusted Workstation).
 - f. (U) Continue investigation of LAN and operating system security issues, services, placements, and mechanisms.
 - g. (U) Perform security engineering for the TSMB design.
 - h. (U) Develop MLS demonstration at CINCPACFLT.
 - i. (U) Develop common functional blocks and methods to generate certification evidence.
 - j. (U) Investigate integration and certification techniques and secure system integration guidelines for secure Navy systems.
3. (U) **FY 1993 PLANS:**
 - a. (U) Complete OSS Phase II (MLS Server and Data Base Front End).
 - b. (U) Continue investigation of LAN and operating system security issues, services, placements, and mechanisms.
 - c. (U) Perform CIEL assessments of trusted products and components on a systems level and develop additional post-IOC enhancements.
 - d. (U) Complete MLS demonstration at CINCPACFLT.
 - e. (U) Develop common functional blocks and investigate integration and certification techniques for secure Navy systems.
 - f. (U) Publish secure system integration guidelines and methods to generate certification evidence for secure Navy systems.
 - g. (U) Develop guidelines for extending product evaluations to different hardware platforms.
 - h. (U) Develop methods for describing system-level security properties in terms of the security properties of the individual components.
4. (U) **PROGRAM TO COMPLETION:** This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL, Washington, DC; NOSC, San Diego, CA **CONTRACTOR:** MITRE, Boston, MA; Booz-Allen & Hamilton, Washington, DC

F. (U) RELATED ACTIVITIES: The following program elements address aspects of computer and system security relevant to the success of this project: PE 0301567G Consolidated Computer Security Program, PE 0602301E Strategic Technology, PE 0303401N Communication Security, and PE 0603794N C3 Advanced Technology.

G. (U) OTHER APPROPRIATION FUNDS: None. Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604574N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Navy Tactical Computer Resources
PROJECT NUMBER: X1976 PROJECT TITLE: Next Generation Computer (NGC)

A. (U) RESOURCES (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
X1976	NGC	11,974	19,197	23,715	CONT.	CONT.

B. (U) DESCRIPTION: The Next Generation Computer (NGC) program will establish a set of jointly defined Navy and industry computer hardware and software interface standards that take maximum advantage of ongoing commercial open system architecture and standardization trends in these three major areas:

MultiProcessor Interconnect Multisystem Interconnects Software

Backplane	Local Area Net - SAFENET	Operating System (OS)
High Performance Backplane	High Performance Local	Database Mgmt. Sys.
High Speed Data Transfer	Area Network (LAN)	Project Support Environment
		Graphics Language and Interface

The NGC program encompasses or is affiliated with all future tactical computer resources for the full range of Navy Mission Critical Computer Resources (MCCR) shipboard, aircraft and shore-based systems. NGC standards will provide for a wide range of functions from data manipulation and communications routing to signal and symbolic processing.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Started Engineering studies for High Performance LAN (HP LAN).
- b. (U) Began Backplane and Survivable Adaptable Fiber Optic Embedded Network (SAFENET) Local Area Network (LAN) systems integration support with user programs.
- c. (U) Began joint industry/Navy working group to define standards for High Speed Data Transfer Network (HSDTN) and Project Support Environment (PSE).
- d. (U) Continued Backplane and SAFENET LAN standards laboratory test model contracts.
- e. (U) Continued development of certification methodology and procedures.
- f. (U) Continued Working Groups to define and to publish Backplane, SAFENET LAN, and Operating Systems (OS) interface standards.
- g. (U) Continued engineering studies for Data Base Management Systems (DBMS), and Graphics interface standards.
- h. (U) Completed definition of MIL-SPEC "Ruggedized Commercial Equipment".
- i. (U) Continued SAFENET LAN interim certification testing to support initial standards users.
- j. (U) Published draft SAFENET LAN interface standard and handbook for Tri-Service Review.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604574N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Navy Tactical Computer Resources

PROJECT NUMBER: X1976 PROJECT TITLE: Next Generation Computer (NGC)

2. (U) FY 1992 PROGRAM:

- a. (U) Begin conformance test capability and certification for Backplane and SAFENET LAN.
- b. (U) Establish industry/Navy working groups to define interface standards for DBMS, Graphics, and HP LAN.
- c. (U) Start Architectural Test Bed requirements analysis.
- d. (U) Begin OS conformance test methodology investigation.
- e. (U) Establish System Security Task Group.
- f. (U) Establish User Task Group.
- g. (U) Establish Fault Tolerance Task Group.
- h. (U) Continue Backplane and SAFENET LAN systems integration support with user programs.
- i. (U) Continue joint industry/Navy working groups to define and publish interface standards: Backplane, SAFENET LAN, OS, HSDTN, and PSE.
- j. (U) Award OS evaluation model contracts.
- k. (U) Complete Backplane, SAFENET LAN standards laboratory test model contract.
- l. (U) Continue developing certification methodology and procedures.
- m. (U) Publish Backplane and SAFENET MIL-STD.
- n. (U) Complete baseline conformance test procedures for Backplane and SAFENET LAN test capability.
- o. (U) Milestone II decision.

3. (U) FY 1993 PLANS:

- a. (U) Establish joint industry/Navy working group to define High Performance (HP) Backplane standards.
- b. (U) Continue OS conformance test procedure methodology investigation.
- c. (U) Continue Security Task Group, User Task Group, and Fault Tolerance Task Group.
- d. (U) Continue joint industry/Navy working groups to define and publish High Speed Data Transfer Network, SAFENET LAN, HP LAN, OS, DBMS, PSE, Graphics Interface standards to satisfy Next Generation Computer user requirements.
- e. (U) Continue conformance test capability for Backplane and SAFENET LAN.
- f. (U) Complete Architectural Test Bed requirements analysis.
- g. (U) Continue Backplane and SAFENET LAN systems integration support with users programs.
- h. (U) Continue development of certification methodology and procedures.
- i. (U) Complete the Navy technical inputs for inclusion in the definition and approval of the following IEEE OS documents to be referenced in the final NGC OS MIL-STD: 1) IEEE P1003.0 - POSIX Guide, 2) P1003.1 - Language Independent Specification, 3) P1003.4a/b- POSIX Real Time, 4) P1003.5 - Ada Bindings, 5) P1003.7 - System Administration, 6) P1003.12 - Protocol Independent Specification, 7) P1003.17 - Directory Services/Name Space, 8) P1238 - FTAM Interface.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604574N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Navy Tactical Computer Resources

PROJECT NUMBER: X1976 PROJECT TITLE: Next Generation Computer (NGC)

j. (U) Complete the Navy technical inputs for inclusion in the definition and approval of the following ANSI, ISO and IEEE documents to be referenced in the addendum to the NCC SAFENET MIL-STD: 1) ANSI X3T9.5 - Fiber Distributed Data Interface - Station Management, 2) ISO X383.3 - IEEE Project 802 - Network Management, 3) IEEE 802.1 - IEEE Project 802 - Network Management, 4) IEEE 802.2 - Logical Link Control, 5) IEEE 802.5 - Fiber Optics. Additional standards groups participation include the Xpress Transport Protocol Technical Advisory Board (XTP TAB) and the National Institute of Standards and Technology (NIST) OIW for Network Management and Operating Systems.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NOSC, San Diego, CA.; NADC, Warminster, PA.; NAC, Indianapolis, IN.; NSWC, Dahlgren, VA.; NATC, Patuxent River, MD.; NWC, China Lake, CA.; NUSC, Newport, RI.; NWSOC, Crane, IN. CONTRACTORS: Numerous companies participating in the working groups (at their expense). Competitive contracts awarded with Cable & Computer Technology, Anaheim, CA; Litton Systems, Pascagoula, MS; and Raytheon, Sudbury, MA.

E. (U) COMPARISON WITH THE FY 1992/93 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not Applicable.
2. (U) SCHEDULE CHANGES: Not Applicable.
3. (U) COST CHANGES: Not Applicable.

F. (U) PROGRAM DOCUMENTATION:

Operational Requirement	08/88
Acquisition Plan	06/89
Program Master Plan	06/89
TEMP	06/91

G. (U) RELATED ACTIVITIES: The following Program Elements fund the development of broadbase computer systems technology and products providing the basis for transition to the NCC Program under project X1976.

Program Element	0601101E, Defense Research Sciences
Program Element	0602301E, Strategic Technologies
Program Element	0602708E, Integrated Command and Control Technology
Program Element	0603223C, Systems Concepts and Battle Management

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE:

Milestone II	- 4Q FY92
Milestone III	- 2Q FY96

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604574N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: NAVY TACTICAL COMPUTER RESOURCES
PROJECT NUMBER: W0845 PROJECT TITLE: AN/AYK-14

C. (U) DESCRIPTION: Navy Standard Airborne Computer (AN/AYK-14) project provides for airborne digital computer requirements. The objective is the reduction of proliferation of unique Contractor Furnished Equipment computer systems. A standard design with flexibility that permits technology infusion to keep pace with new requirements through pre-planned product improvements. Very High Speed Integrated Circuit (VHSIC) infusion, funded in part by DOD, provides user aircraft up to 18 million instructions per second processing power. The AN/AYK-14(V) is supplied as GFE to Navy weapon systems.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Completed VHSIC-based AYK-14(V) computer qualification.
- b. (U) Started VHSIC production deliveries.
- c. (U) Continued follow-on development of state-of-the art technology improvements for the AYK-14(V) in support of user requirements including:
 - (1) (U) Started development of a 50 MHz serial High Speed Data Bus (HSDB) module.
 - (2) (U) Started development of an Interactive Voice I/O Module (VIM) to enable voice control of computers, radios and weapon system.
 - (3) (U) Started development of an embedded Video Processor Module (VPM) Set to reduce aircraft weight and reduce video latency.
 - (4) (U) Started development of a 32-bit Reduced Instruction Set Computer (RISC) AYK-14(V) configuration for the SH-60 and E-2C.
 - (5) (U) Completed concept formulation of an embedded Global Positioning System (GPS) module set.

2. (U) FY 1992 PROGRAM:

- a. (U) Continue follow-on module developments including:
 - (1) (U) Complete demonstration of HSDB module and VPM Set.
 - (2) (U) Continue development of 32-bit RISC including Futurebus+ backplane AN/AYK-14(V) configuration, and VIM module.

3. (U) FY 1993 PLANS:

- a. (U) Complete demonstration flight test of VIM.
- b. (U) Test prototype 32-bit RISC and Futurebus+ backplane.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAC, Indianapolis, IN; NATC, Patuxent River, MD; NADEP, Norfolk, VA. CONTRACTORS: Control Data Corp., Minneapolis, MN.

F. (U) RELATED ACTIVITIES: Not Applicable.

G. (U) OTHER APPROPRIATION FUNDS: Applicable airframe appropriations include: F/A-18, F-14D, V-22, AV-8B, E-2C, EA-6B, SH-60B, EP-3, ES-3, Tactical Operations Center (TAOC), P-3 AEW, ALQ-149, Automatic Carrier Landing System (ACLS), MK-50 torpedo, CV-FTAS, VP-FTAS, and Army JSTARS. Procurement appropriation information not available at this level of detail.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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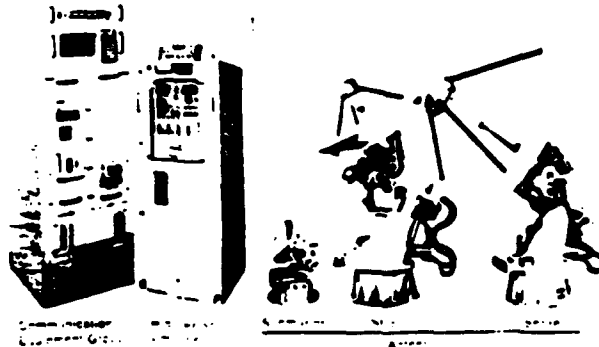
FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604577N

BUDGET ACTIVITY: 5

PROGRAM ELEMENT TITLE: EHF SATCOM

PROJECT NUMBER: X0728 PROJECT TITLE: Navy EHF SATCOM Terminals



POPULAR NAME: NESP

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	TO COMPLETE
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Program			MS IIIB 12/92	
Milestones			Terminal IOC 9/93	

Engineering	NECC SRR	NECC SDR 1/92	NECC EDM Engineering	
Milestones	8/91	NECC PDR 8/92	Development Model	
			6/93	

T&E	MT-IIC 10/90	MT-IID 3/92	DT-III 9/93	OT-III 2Q/94
Milestones		DT-IIJ 7/92		NECC DT 1Q/94
		OT-IIC 7/92		

Contract
Milestones

BUDGET (\$000)	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
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Major Contract	4,120	17,184	12,552	Continuing
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Support Contract	2,127	1,948	1,662	Continuing
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In-House Support	10,990	14,628	13,102	Continuing
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GFE/ Other	67	52	54	Continuing
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Total	17,304	33,812	27,369	Continuing
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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604577N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: EHF SATCOM
PROJECT NUMBER: X0728 PROJECT TITLE: Navy EHF SATCOM Terminals

B. (U) DESCRIPTION: Navy Extremely High Frequency (EHF) Satellite Communications Program provides for the development and production of terminals to provide anti-jam, low probability of intercept communications capability for Command and Control of the fleet. The terminals will provide physical and electro-magnetically survivable, worldwide communications in the current and projected electromagnetic and nuclear threat. Navy EHF terminals are interoperable with Army and Air Force terminals and will operate with Milstar as well as EHF packages on-board Ultra High Frequency (UHF) Follow-On (UFO) Satellites four through nine. Navy terminals operated during Desert Storm with EHF packages on-board Fleet Satellite 8. The increased capability provided by EHF terminals is accomplished by use of the wider bandwidths available at extremely high frequencies, narrow antenna beamwidths, spread spectrum techniques, on-board satellite processing and advanced signal processing technology.

(U) The Navy EHF Communications Controller (NECC) provides automated, netted tactical data exchange (IXS) over jam resistant EHF satellite links. The NECC will establish EHF SATCOM networks, control data transfer over the networks and act as a gateway between networks.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Performed Milstar and Tri-Service Interoperability Testing
- b. (U) Defined terminal impact from emergent Milstar nodes
- c. (U) Performed follow-on testing with on-orbit EHF package
- d. (U) Defined NECC development requirements, begin NECC development

2. (U) FY 1992 PROGRAM:

- a. (U) Perform Milstar Tri-service testing with first Milstar satellite.
- b. (U) Develop upgraded terminal microprocessor to support terminal upgrades for Milstar and Tri-service compatibility.
- c. (U) Begin new Milstar protocols development
- d. (U) Commence UFO Interoperability Testing
- e. (U) Complete Build 1 development and demonstration of NECC
- f. (U) Conduct terminal First Article Testing
- g. (U) Conduct follow-on Operational Test and Evaluation (OT-IIC)

3. (U) FY 1993 PLANS:

- a. (U) Complete development of new microprocessor
- b. (U) Continue Milstar and Tri-Service Interoperability testing
- c. (U) Begin testing of new Milstar protocols
- d. (U) Continue UFO Interoperability Testing
- e. (U) Integrate Build 2 into NECC
- f. (U) Conduct system Initial Operational Test & Evaluation with the Milstar satellite

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604577N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: EHF SATCOM
PROJECT NUMBER: X0728 PROJECT TITLE: Navy EHF SATCOM Terminals

D. (U) WORK PERFORMED BY: In-House: Lead laboratory is NAVOCEANSYSCEN, San Diego, CA; NUSC, New London, CT; NAVELEXSYSENGCEN, Vallejo, CA; NRL, Washington, DC; NAVSWC, White Oak, MD; NAVELEXSYSENGCEN, Portsmouth VA; NAVELEXSYSENGCEN, Charleston, SC. Contractors: Raytheon, Sudbury, MA; Booz, Allen & Hamilton Inc., Bethesda, MD.

E. (U) COMPARISON WITH REVISED FY 1992/93 PRESIDENT'S BUDGET:

1. TECHNICAL CHANGES: None
2. SCHEDULE CHANGES: None
3. COST CHANGES: None

F. (U) PROGRAM DOCUMENTATION:

DCP X0728, 4/89

TEMP Number 784 (Rev. 1), 4/89 N.B. TEMP (Rev. 2) now being prepared to reflect OTIIC & MILSTAR interoperability.

Joint Milstar Communications Control and Operations Concept

(JMCCOC) Vol I (1ST Rev.- 6/89) and Vol II (1ST Rev.- 8/89)

Milstar Multi-service TEMP, 2/88

G. (U) RELATED ACTIVITIES: The Navy EHF SATCOM Program is part of the Tri-service Milstar program. The Milstar satellite is being developed by the Air Force. Terminals are being developed by the Air Force, Army and Navy. Terminal requirements are coordinated by the Joint Terminal Program Office. Related PEs are: PE 0303603F, Milstar; PE 0303601F, Air Force Satellite Communications; PE 0303603N, Milstar Joint Terminal Program Office; PE 0303142A, Extremely High Frequency Communications Terminal; PE 0602721N, Navy Extremely High Frequency Exploratory Development Program.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN #118,119*	101,874	125,825	140,363	CONT.	CONT.

* Includes EHF terminal and NECC procurement and installation.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) TEST AND EVALUATION DATA: Terminal Operational Test and Evaluation was completed in September 1990. The terminal was considered operationally effective and suitable. An exception was the reliability of the system which included other equipment in addition to the terminal. Terminal reliability is to be reassessed in follow-on operational testing by the Navy's independent test agency, OPTEVFOR, summer of 1992. In addition, the Analyze and Fix (TAAF) program to measure terminal reliability will be expanded on production assets delivered in FY 93.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604601N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Mine Development

A. (U) RESOURCES: (Dollars in thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0267	Mine Improvements	5,370	2,727	1,885	CONT.	CONT.
S0272	QUICKSTRIKE	6,803	5,976	6,514	CONT.	CONT.
	Total	12,173	8,703	8,399	CONT.	CONT.

B. (U) DESCRIPTION: This program provides for engineering, development, support systems, test models, tests, and other Mine Warfare related research and development to counter current and future enemy submarines and surface ships. The Mine Improvements project (S0267) is specifically aimed at improving existing mine subsystems or components to maintain operational effectiveness, quality, and reliability. Efforts include elements such as: sensors, software, power supplies, flight gear, threat data collection, effectiveness evaluation, mine algorithm development, and training systems. The QUICKSTRIKE project (S0272) is for development of major subsystems of mines. Current development effort is the QUICKSTRIKE Mod 3 system utilizing the Target Detecting Device MK 71 and Safety-Arming device MK 75.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604601M

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Mine Development

PROJECT NUMBER: 80267

PROJECT TITLE: Mine Improvements

C. (U) DESCRIPTION: This project updates mine components and support systems to accommodate evolving mine targets and mining scenarios. Data on threat targets, minefield locations, and enemy tactics are collected; the performance of current mines in those scenarios are determined; needed changes to sensors, power supplies, flight gear, mine algorithms, counter-countermeasures, and minefield planning models are identified; and prototypes are built, tested, and evaluated.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Continued improvements to data acquisition and analysis, software/logic, and minefield model applications.
- b. (U) Conducted follow-on development and testing of the MK164 Flight Gear Kit.
- c. (U) Supported the Advanced Bomb Family (ABF) and Insensitive Munitions Programs (IMP).
- d. (U) Completed development of integrated data format and validation of magnetic/pressure facility.

2. (U) FY 1992 PROGRAM:

- a. (U) Continue improvements in software/logic, sensors, minefield model applications, and support for the ABF and IMP.
- b. (U) Continue follow-on tests of the MK164 Flight Gear Kit.
- c. (U) Begin development of lithium power supply for MK 71 Target-Detecting Device (TDD).

3. (U) FY 1993 PLANS:

- a. (U) Complete follow-on test program for MK164 Flight Gear Kit.
- b. (U) Continue improvements in mine sensors, software/logic, and model applications.
- c. (U) Continue support for the Joint Direct Attack Munition (formerly ABF) and Insensitive Munitions programs.
- d. (U) Continue development of lithium power supply for MK71 TDD.
- e. (U) Complete algorithms for Underwater Electric Potential (UEP) and special sensors.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NSWC, White Oak, MD; and NMWEA, Yorktown, VA. CONTRACTORS: Not Applicable.

F. (U) RELATED ACTIVITIES: Not Applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604601N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Mine Development

PROJECT NUMBER: 80272

PROJECT TITLE: QUICKSTRIKE

C. (U) DESCRIPTION: QUICKSTRIKE series mines are a family of modern bottom mines adapted from 500/1,000/2,000 lb. general-purpose bombs and a 2,000 lb. MK65 mine, coupled with associated Safety and Arming (S/A) Devices, Flight Gear, and Target Detecting Devices (TDD). This program develops the QUICKSTRIKE Mod 3 system whose principal component is the TDD MK 71, a three sensor (magnetic/seismic/pressure), programmable mine firing device. The flexibility inherent in this TDD will allow for continued adaptation of the mine logic and firing criteria in response to changes in mining scenarios and enemy threat and tactics.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Continued contractor Full Scale Development of the QUICKSTRIKE Mod 3 System/TDD MK71.

2. (U) FY 1992 PROGRAM:

a. (U) Conduct TECHEVAL of the QUICKSTRIKE Mod 3 System.

3. (U) FY 1993 PLANS:

a. (U) Conduct OPEVAL of the QUICKSTRIKE Mod 3 System.

b. (U) Obtain Approval for Full Rate Production (AFRP) of the QUICKSTRIKE Mod 3 System/TDD MK71 and S/A MK75.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NSWC, White Oak, MD and NMWEA, Yorktown, VA. CONTRACTORS: Sparton Defense Electronics, Jackson, MI.

F. (U) RELATED ACTIVITIES: Not Applicable.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
PROCUREMENT					
WPN (#36)	16,093	11,093	8,801	CONT.	CONT.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604602N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Naval Gunnery Improvements

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1991 ACTUAL	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S0178	Gun Fire Control Systems Improvements	2,321	2,335	2,629	CONT	CONT
S1706	Ballistic Ammo Improvements	4,168	2,118	2,652	CONT	CONT
S1894	16" Naval Gun Fire Improvements	142	0	0	0	20,233
	TOTAL	6,631	4,453	5,281	CONT	CONT

B: (U) DESCRIPTION: The Naval Gunnery Improvement Program provides for research and development in all areas of Naval Gunfire. Specifically, this program funds all ongoing analysis of and improvements to naval gunfire control systems, gun ammunition.

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FY 1992 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604602N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Naval Gunnery Improvements

PROJECT NUMBER: S0178

PROJECT TITLE: Gun Fire Control System Improvement

C. (U) DESCRIPTION: This project supports efforts to improve the following:

- MK 86 Gun Fire Control System (GFC) provides control of 5"/54 gun mounts and guides SM-1 and SM-2 missiles on destroyers, guided missile destroyers and cruisers, and helicopter assault ships for area and self-defense against air and surface craft.

- MK 160 Gun Computing System (GCS) provides gun fire control interface between AEGIS weapon system and 5"/54 gun mounted on DDG-51 Class ships.

- EX 46 Optical Sight provides electro-optical (E/O) target data to the MK 34 Gun Weapon System (GWS) which includes MK 160 GCS and potentially to other gun fire control systems.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Updated MK 86 GFC performance baseline. Completed development of MK 86 efficient memory usage. Completed development of High Speed Maneuvering Surface Target (HSMST) modification for MK 86 GFC. Developed product improvements for MK 86 GFC to increase detection of small, low-flying missiles and aircraft.

- b. (U) Integrated E/O capability into MK 160 GCS.

2. (U) FY 1992 PROGRAM:

- a. (U) Continue update of MK 86 GFC baseline. Provide engineering support and sub-system equipments to ASMD/SPQ-9(i) program for concept demonstration. Develop plan to integrate EX 46 Optical Sight components to MK 86 Optical Sight.

- b. (U) Continue development, test, and integration of E/O capability into MK 160 GCS. Develop extended range capability of EX 46 Optical Sight.

3. (U) FY 1993 PLANS:

- a. (U) Continue update of MK 86 GFC baseline. Continue engineering support during Anti-Ship Missile Defense (ASMD) concept demonstration and follow-on development of ASMD/SPQ modifications. Integrate EX 46 Optical Sight components into MK 86 Optical Sighting System MK-1.

- b. (U) Complete integration of E/O capability into MK 160 GCS. Continue development, test, and integration of extended E/O range of EX 46 Optical Sight.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY:

IN-HOUSE: MK 86 GFC: NWSSES Port Hueneme, Ca.; MK 160 GCS: NOS, Louisville, Ky.; EX 46: NOS, Louisville, Ky. CONTRACTORS: MK 86 GFC: Lockheed/Sanders Inc., Nashua, NH.; MK 160 GCS: Unisys, Great Neck, NY.; EX 46 OS: Kollmorgen, Northampton, Ma.

F. (U) RELATED ACTIVITIES: Not Applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604602N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Naval Gunnery Improvements

PROJECT NUMBER: S1706

PROJECT TITLE: Ballistic Gun Ammo Improvements

C. (U) DESCRIPTION: This program supports a congressionally directed requirements study and technology survey to develop alternatives for meeting the Navy's future Naval Surface Fire Support (NSFS) needs. This program will join a Navy/Marine program for 25mm Advanced Multi-Purpose Ammunition and also develop ammunition for the Advanced Minor Caliber Gun. Additionally, this program supports research and development data exchange with various foreign navies via Data Exchange and International Exchange Programs.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Completed hot-gun cookoff safety tests of Low Vulnerability Ammunition (LOVA) charge and MK 64 projectile in 5"/54 gun. The tests were unsuccessful, therefore the program was terminated.

b. (U) Initiated development of 25mm Advanced Multi-Purpose Ammunition. This is a joint NAVAIR, Marine Corps, and NAVSEA funded program. Improved rounds will provide improved effectiveness and standardization.

c. (U) Continued analysis of improvement to ballistic ammunition.

d. (U) Initiated 30mm Ammunition qualification/safety program of Advanced Minor Caliber Gun System (OR #243-03-92). Effort for Advanced Minor Caliber Gun System will continue under PE 0603656N, project S2038.

e. (U) Awarded contract for 30mm ammunition development .

f. (U) Continued 30mm Ammunition qualification/safety tests/certification.

2. (U) FY 1992 PROGRAM:

a. (U) Award Phase I Full-Scale Development Contract for 25mm Advanced Multi-Purpose Ammunition.

b. (U) Compile Congressionally mandated NSFS alternatives matrix.

c. (U) Prepare NSFS Threat, Mission, and Cost and Operational Effectiveness Analysis (C&OEA) report.

d. (U) Initiate evaluation of Marine Mission Needs for NSFS.

e. (U) Initiate Over The Horizon target detection, identification, classification, and targeting engineering evaluation.

f. (U) Initiate munition lethality and effectiveness engineering evaluation.

g. (U) Support data exchange program.

3. (U) FY 1993 PLANS:

a. (U) Award Phase II development contract for 25mm Advanced Multi-Purpose Ammunition.

b. (U) Complete NSFS efforts.

4. (U) Program to completion: This is a continuing program.

E. (U) WORK PERFORMED BY: In-House: NWC, China Lake, CA; NOS, Louisville, KY; NAVSWC, Dahlgren, VA; Contractors: TED.

F. (U) RELATED ACTIVITIES: P.E. 0206623N - MC Ground Combat/Supporting Arms System, P.E. 0604603N - Unguided Conventional Air Launched Weapons, P.E. 0603656N - Advanced Minor Caliber Gun System.

G. (U) OTHER APPROPRIATIONS FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604603N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: UNGUIDED CONVENTIONAL AIR-LAUNCHED WEAPONS

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
E1341	ABN Guns and Ordnance	5,476	10,678	10,291	Cont.	Cont.
W1844	ABN ASW NUCL WPN	16	0	0	0	3,145
TOTAL		5,492	10,678	10,291	Cont.	Cont.

B. (U) DESCRIPTION:

1. (U) Project E1341 is a continuing program improving Navy and Marine Corps air launched weapons. Major items in this program are the 2.75 inch rocket motor and warhead improvements which will become part of the projected Advanced Rocket System (ARS) and the 25MM Advanced Multipurpose Projectile (AMP) which will become the universal projectile for use in all Department of the Navy 25MM gun systems. TOW 2A (AIR) improvements to enhance shipboard compatibility include incorporation of an ignition safety device (ISD) for the rocket motors and case upgrades to enhance Hazards of Electromagnetic Radiation to Ordnance (HERO) capabilities of the missile system.

2. (U) Project W1844 developed and integrated the Bomb Dummy Unit (BDU-53) for testing and certifying aircraft and aircrews to use B90 Nuclear Depth/Strike Bomb (NDSB). The scope of work encompassed prototype design and fabrication, laboratory testing, design of production representative items, initial production planning, and BDU aircraft integration efforts.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604603N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: UNGUIDED CONVENTIONAL AIR-LAUNCHED WEAPONS
PROJECT NUMBER: E1341 PROJECT TITLE: ABN Guns Ordnance

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT	FY 1991	FY 1992	FY 1993	TO	TOTAL
NUMBER TITLE ACTUAL	ESTIMATE	ESTIMATE	COMPLETE	PROGRAM	
E1341 ABN Guns and Ordnance	5,476	10,678	10,291	Cont.	Cont.

B. (U) DESCRIPTION:

1. (U) Project E1341 is a continuing program improving Navy and Marine Corps air launched weapons. Major items in this program are the 2.75 inch rocket motor and warhead improvements which will become part of the projected Advanced Rocket System (ARS) and the 25MM Advanced Multipurpose Projectile (AMP) which will become the universal projectile for use in all Department of the Navy 25MM gun systems. TOW 2A (AIR) improvements to enhance shipboard compatibility include incorporation of an ignition safety device (ISD) for the rocket motors and case upgrades to enhance Hazards of Electromagnetic Radiation to Ordnance (HERO) capabilities of the missile system.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- (U) Completed the Foreign Weapons Evaluation of the high impulse 2.75-inch rocket motor and NATO Comparative Test of anti-ship and anti-material warheads.
- (U) Released Request for Proposal (RFP) for Advanced Rocket System Engineering and Manufacturing Development (E&MD) contract.
- (U) ARS Test and Evaluation Master Plan (TEMP) was approved.
- (U) Completed engineering feasibility assessment, development program schedule and cost analysis for ISD for TOW 2A (AIR).
- (U) Initiated case update, engineering design, cost/schedule development and test planning for TOW 2A (AIR).
- (U) Oversight of the cooperative Navy/Marine Corps Advanced Multipurpose Ammunition program.

2. (U) FY 1992 PROGRAM:

- (U) Obtain Milestone-II approval to commence ARS E&MD.
- (U) Award ARS E&MD contract.
- (U) Begin ARS E&MD.
- (U) Begin ARS aircraft integration efforts.
- (U) Complete engineering development of TOW 2A (AIR) ISD and begin qualification testing.
- (U) Complete TOW 2A case upgrade development and qualification testing.
- (U) Complete TOW 2A Logistics Review Group Audit.
- (U) Oversight of the cooperative Navy/Marine Corps AMP program.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604603N BUDGET ACTIVITY: 4
 PROGRAM ELEMENT TITLE: UNGUIDED CONVENTIONAL AIR-LAUNCHED WEAPONS
 PROJECT NUMBER: E1341 PROJECT TITLE: ABN Guns and Ordnance

3. (U) FY 1993 PLANS:

- a. (U) Continue ARS E&MD Contract effort.
- b. (U) Continue ARS aircraft integration efforts.
- c. (U) In accordance with Navy/Marine Corps Memorandum of Agreement, NAVAIR will provide funding to participate in on going Navy/Marine Corps Advanced Multipurpose Ammunition Program. The program moves in Phase II of E&MD, which involves fabrication and test and evaluation of test articles.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NWC, China Lake, CA; PMTC, Point Mugu, CA; NOS, Indian Head, MD; NWSC, Crane IN; NAVSWC, Dahlgren, VA; NATC, Patuxent River, MD; Contractors: Hughes Aircraft Company, Tucson, AZ.

E. (U) COMPARISON WITH FY 1992/93 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: None.
2. (U) SCHEDULE CHANGES: None.
3. (U) COST CHANGES: None.

F. (U) PROGRAM DOCUMENTATION:

Operational Requirement	APR 88 (ARS)
Acquisition Plan	APR 91 (ARS)
Justification & Approval	JUN 91 (ARS)
TEMP	AUG 91 (ARS)
Integrated Program Summary	Currently being prepared.
Operational Requirement	AUG 88 (TOW IIA (AIR))

G. (U) RELATED ACTIVITIES: Not Applicable.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

APPN/P-1#	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT(WPN)					
P-1 #52 2.75	24.1	12.2	15.0	cont.	cont.
(U) PROCUREMENT(WPN)					
P-1 TOW IIA (AIR)	3.5	0	23.9	cont.	cont.
#14					

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: For ARS the following programs have been evaluated under the NATO Comparative Test Program funded with Foreign Weapon Evaluation funds. All evaluations are complete: Rocket Motor - Canada - Bristol Co.; Warhead - France - Thompson Brandt Co.; Warhead - Norway - Raufoss Co. None for the TOW 2A (AIR). As tested, none of the foreign items met USN requirements.

J. (U) MILESTONE SCHEDULE:

ARS MS II	MAY 92
ARS MS III	FEB 97

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604609N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: BOMB FUZE IMPROVEMENT
PROJECT NUMBER: E1512 PROJECT TITLE: ADVANCED BOMB FAMILY

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
E1512	ADVANCED BOMB FAMILY	15,197	15,401	0	0	50,498

B. (U) DESCRIPTION: This program responds to operational requirements which reflect the need to introduce major improvements to existing munitions and to develop new armaments to meet the Service's combat needs and is essential to the development of Advanced Bomb Family.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:

- a. (U) Conducted Systems Requirements Review.
- b. (U) Conducted Navy Program Review.
- c. (U) Continued Phase I preparations for Engineering & Manufacturing Development (E&MD).
- d. (U) Continued risk reduction and prototyping efforts.
- e. (U) Demonstrated aeroshape of both the 500# and 1,000# class weapons.

2. (U) FY 1992 Program:

- a. (U) Revise acquisition strategy to address operational requirement with Joint Direct Attack Munitions Program (Air Force lead).
- b. (U) Complete risk reduction & prototype demonstration efforts.
- c. (U) Release Request for Proposal (RFP) for E&MD contract.
- d. (U) Perform source selection activities.

3. (U) FY 1993 Plans:

- a. (U) Effort ends on Advanced Bomb Family. Joint service work continues under Program Element (PE) 0604618N - Joint Direct Attack, Project Number E2137.

4. (U) Program to Completion: Not Applicable.

D. WORK PERFORMED BY: IN-HOUSE: NWC, China Lake, CA; Sandia National Laboratory, Albuquerque, NM; Lawrence Livermore National Laboratory, DOE.
CONTRACTORS: TED (COMPETITIVE CONTRACT).

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604609N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: BOMB FUZE IMPROVEMENT
PROJECT NUMBER: E1512 PROJECT TITLE: ADVANCED BOMB FAMILY

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) Technology Changes: NONE
2. (U) Schedule Changes: Schedule adjustments were necessary to accommodate lessons learned from Operation Desert Storm. Operational Requirement has been adjusted to reflect lessons learned in Operation Desert Storm. The effort was expanded to increase penetrator and precision guidance requirements. The RFP was updated, and the E&MD contract award schedule is adjusted to FY 93.
3. (U) Cost Changes: FY 93 - \$27.5M - Program Element 0604618N, entitled Joint Direct Attack program was established to continue the effort under a joint Navy/Air Force program.

F. (U) PROGRAM DOCUMENTATION:

TENTATIVE OPERATIONAL REQUIREMENT	5/87
DEVELOPMENT OPTION PAPER	7/88
OPERATIONAL REQUIREMENT	3/89
ACQUISITION PLAN	5/90
TEST & EVALUATION MASTER PLAN	1/91

G. (U) RELATED ACTIVITIES: Not Applicable.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604612M

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Marine Corps Mine Countermeasures Systems (Engineering Development)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C0080	Mine Warfare (Engineering)	0	49	432	96	19,905
C1969	Mine Neutralization Equipment	3,727	1,125	2,539	1,573	19,968
C1970	Surf Zone Mine Clearing	12,344	0	0	0	51,000
TOTAL		16,071	1,174	2,971	1,669	90,873

B. (U) DESCRIPTION: This program element covers a wide variety of present and emerging technologies which are projected to contribute to the Marine Corps Mine/Countermine system capability. Largely focused on countermine efforts, this program element will specifically develop systems which will detect or neutralize mines. The dynamic nature and complexity of the countermine problem and its relative urgency necessitates the advanced development of a variety of systems which will each contribute to achieving overall countermine effectiveness.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604612M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Mine Countermeasures Systems (Engineering Development)
PROJECT NUMBER: C0080 PROJECT TITLE: Mine Warfare (Engineering)

C. (U) DESCRIPTION: The Magnetic Countermine System (MACS) project develops systems for breaching and proofing lanes through minefields during amphibious and inland operations for the Marine Corps. Currently the Marine Corps is deficient in systems that counter magnetically influenced mines, which are becoming a larger portion of the threat. MACS will project a false magnetic signal ahead of the vehicle it is attached to causing magnetically influenced mines to prematurely detonate.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Foreign Comparative Test (FCT) of Israeli Anti-Magnetic Mine Actuating Device (AMMAD) system, with FCT funds.

2. (U) FY 1992 PROGRAM:

a. (U) Complete FCT of AMMAD system.

b. (U) Prepare and publish requests for proposal (RFP) for full scale engineering development (FSED) of a MILSPEC, durable flexible electromagnetic coil system.

3. (U) FY 1993 PLANS:

a. (U) Award FSED contract to MILSPEC and harden a field expedient flexible electromagnetic coil system that was procured for DESERT SHIELD/STORM, improving it for a longer term magnetic countermine system.

b. (U) FSED contractor finished development of the flexible electromagnetic coil system and Milestone III documentation prepared.

c. (U) Assess application of AMMAD to Advanced Amphibious Assault Vehicle (AAAV) mounted mine plow.

4. (U) PROGRAM TO COMPLETION: This program completes full scale development and Milestone III decision in FY 1994.

E. (U) WORK PERFORMED BY: IN-HOUSE: MARCORSYSCOM, Quantico, VA; NWSC, Crane, IN. CONTRACTORS: NONE.

F. (U) RELATED ACTIVITIES: NONE.

G. (U) OTHER APPROPRIATION FUNDS: NONE.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: FCT to be conducted in accordance with Department of Defense Order 5000.3-M-2.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604612M BUDGET ACTIVITY: 4
 PROGRAM ELEMENT TITLE: Marine Corps Mine Countermeasures Systems (Engineering Development)
 PROJECT NUMBER: C1969 PROJECT TITLE: Mine Neutralization Equipment

C. (U) DESCRIPTION: This program will test and evaluate existing mine neutralization systems for both individuals and vehicles, and will provide for the engineering development of new technology for mine neutralization applications. The Anti-Personnel Obstacle Breaching System (APOBS) is being developed and tested to replace the World War II vintage Bangalore Torpedo. An Assault Amphibious Vehicle (AAV/7A1) mounted Full Width Mine Rake (FWMR) is being developed to provide minefield proofing for amphibious assaults from the highwater mark inland and where tanks are not employed.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Completed APOBS Developmental Testing (DT) and finished APOBS engineering development.
- b. (U) Obtained Weapons System Explosives Safety Review Board (WSESRB) approval.
- c. (U) Fabricated APOBS systems for Operational Testing (OT).
- d. (U) Completed APOBS level III drawings/specification.
- e. (U) Conducted engineer evaluation of AAV/7-A1 mounted FWMR.

2. (U) FY 1992 PROGRAM:

- a. (U) Conduct APOBS OT.
- b. (U) Prepare Milestone III documentation for APOBS.
- c. (U) Conduct final design selection on AAV/7-A1 mounted FWMR.

3. (U) FY 1993 PLANS:

- a. (U) Obtain final WSESRB and Milestone III approval for APOBS.
- b. (U) Transition APOBS to the Single Manager for Conventional Ammunition for Low Rate Initial Production.
- c. (U) Conduct DT, OT, environmental tests and blast analysis evaluations of AAV/7-A1 mounted FWMR.

4. (U) PROGRAM TO COMPLETION: Final development of AAV/7-A1 FWMR. This program completes in FY 1995 with MS III decision.

E. (U) WORK PERFORMED BY: IN-HOUSE: MARCORSYSCOM, Quantico, VA; NCSC, Panama City, FL; NWSC, Crane, IN; NOS, Indian Head, MD and Louisville, KY; NSWC, White Oak, MD; TECOM, Aberdeen, MD; MCOTEA, Quantico VA. CONTRACTORS: NONE.

F. (U) RELATED ACTIVITIES: NONE.

G. (U) OTHER APPROPRIATION FUNDS: NONE.

	1990 ACTUAL	1991 EST	1992 EST	1993 EST	TO COMPLETE	TOTAL PROG
APOBS	0	0	0	0	19,736	19,736
MINE FLOW	0	0	0	0	1,800	1,800

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604618N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: JOINT DIRECT ATTACK MUNITION
PROJECT NUMBER: E2137 PROJECT TITLE: JOINT DIRECT ATTACK MUNITION

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
E2137	JOINT DIRECT ATTACK	0	0	26,541	Cont.	Cont.

B. (U) DESCRIPTION: This program was previously funded under Program Element 0604609N/Bomb Fuze Improvement; however, this is now a joint program with the Air Force as executive service. The program responds to operational requirements which reflect the need to introduce major improvements to existing munitions and to develop new armaments to meet the Service's combat needs and is essential to the development of Joint Direct Attack Munitions for Navy - specific requirements.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENT: See Program Element 0604609N/Bomb Fuze Improvement.
2. (U) FY 1992 PROGRAM: See Program Element 0604609N/Bomb Fuze Improvement.
3. (U) FY 1993 PLANS
 - a. (U) Integrate inertial guidance equipment on Navy/Marine aircraft.
 - b. (U) Develop 500 lb. bomb and multi-purpose fuze for Navy/Marine Close Air Support requirements.
4. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Eglin AFB, FL.; NWC, China Lake, CA.
CONTRACTORS: TBD (Competitive Contracts).

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) Technology Changes: None.
2. (U) Schedule Changes: None.
3. (U) Cost Changes: FY 1993 funds of \$26,541K were transferred from Program Element 0604609N/Bomb Fuze Improvement.

F. (U) PROGRAM DOCUMENTATION: Joint program documentation under development.

G. (U) RELATED ACTIVITIES: Air Force P.E. 0604618F Joint Direct Attack Munitions.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Joint program schedule being developed by 2Q FY 1992.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604654N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Joint Service Explosive Ordnance Dev (Eng)
PROJECT NUMBER: S1829 PROJECT TITLE: Explosive Ordnance Disposal Procedures

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1829	Explosive Ordnance Disposal Procedures	5,979	5,665	5,986	CONT.	CONT.

B. (U) DESCRIPTION: This is a Joint Service Program. DOD assigned development responsibility for Explosive Ordnance Disposal procedures and equipment to the Navy in support of the Joint Services. This program develops the Explosive Ordnance Disposal techniques required for all known domestic and foreign conventional and nuclear ordnance, and Improvised Nuclear Devices. It also provides for the implementation of the DOD/DOE/FBI Memorandum of Understanding for response to Improvised Nuclear Devices.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:

a. (U) Developed approximately 130 new procedures and provided approximately 450 technical updates of existing procedures.

b. (U)

c. (U)

2. (U) FY 1992 Program:

a. (U) Procure and develop procedures for new, sophisticated threat weapons.

b. (U) Develop

c. (U) Continue on-going procedure development.

3. (U) FY 1993 Plans:

a. (U) Develop disablement procedures for additional threat weapons and provide technical updates to existing procedures.

b. (U) Develop additional

4. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Naval EODTC, Indian Head, MD.
CONTRACTORS: EG&G, Las Vegas, NV; BATTILLE-PNL, Richland, WA.

E. (U) RELATED ACTIVITIES: All conventional or nuclear ordnance related developments, both domestic and foreign, manufactured or improvised.

F. (U) OTHER APPROPRIATION FUNDS: Not applicable.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604656M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Assault Vehicles (Engineering)
PROJECT NUMBER: C2031 Light Armored Vehicle 105

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C2031	LAV-105	18,329	0	0	0	38,048

B. (U) DESCRIPTION: The LAV-105 was to enhance the Light Armored Infantry Battalion (LAI BN) capability to conduct reconnaissance, security, and economy of force operations. With its heavy caliber 105mm main gun, LAV 105 provided accurate fire against light armor, fortified positions, and personnel. LAV-105 provided enhanced capabilities to the LAV 25 and LAV-AT through the integration of a fully stabilized turret, M1A1-type fire control, thermal day sight, autoloader, and laser range finder. Combining light weight components with an accurate heavy caliber weapon would have provided the LAI BN a potent addition.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Program: Continue the fabrication of the LAV-105 prototypes. Complete DT and OT planning.
2. (U) FY 1992 Plans: Program terminated due to affordability and marginal utility of the system.
3. (U) FY 1993 Plans: Not applicable.
4. (U) Program to completion: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604703N

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE: Personnel, Training, Simulation & Human Factors

PROJECT NUMBER: R1822 PROJECT TITLE: Manpower Personnel & Human Factors System

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1991 ACTUAL	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R1822	PERS,TNG	1,060	1,790	1,137	Continuing	Continuing

B. (U) DESCRIPTION: This program applies advanced technologies to operational requirements in manpower, personnel, training, and human factors, transitioning into operation those projects demonstrated in advanced development. Enabling technologies include adaptive testing, math optimization, statistical and econometric forecasting, computer-based simulation, and decision support systems.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:
 - a. (U) Evaluated computerized Armed Services Vocational Aptitude Battery (ASVAB) (Computer Adaptive tasking (CAT)/ASVAB) test at 4 sites.
 - b. (U) Expanded sea/shore rotation analysis model to 32 ratings.
 - c. (U) Completed prototype of recruiter selection tool.
2. (U) FY 1992 PROGRAM:
 - a. (U) Perform operational test and evaluation of CAT/ASVAB.
 - b. (U) Validate methods to determine enlisted personnel quality mix.
 - c. (U) Begin implementation of a prototype course authoring system.
 - d. (U) Extend prototype enlisted assignment system to all ratings.
3. (U) FY 1993 PLANS:
 - a. (U) Refine enlisted cost/performance trade-off model to address required performance needs and job clustering.
 - b. (U) Begin integration of enlisted strength planning system.
 - c. (U) Begin engineering development of a MILSTAR navigation training aid.
 - d. (U) Begin engineering development of prototype for the throttle and stick of the F/A-18 cockpit simulator.
4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVPERSRANDCEN, San Diego, CA.
CONTRACTORS: B-K Dynamics, Rockville, MD; Man Tech, Alexandria, VA; HumRRO, Alexandria, VA.

E. (U) RELATED ACTIVITIES: 0602722A, Personnel and Training; 0602703F, Personnel Utilization Technology; 0603731A, Manpower and Personnel; 0603707N, Manpower, Personnel and Training Advanced Technology Development; 0603632M, Marine Corps Advanced Manpower Training Systems; and 0603704F, Manpower and Personnel Systems Technology.

F. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604704N BUDGET ACTIVITY: 4
 PROGRAM ELEMENT TITLE: ASW Oceanographic Equipment
 PROJECT NUMBER: R1740 PROJECT TITLE: ASW Oceanographic Survey Support

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R1740	ASW Oceanographic Survey Support	960	1,245	1,209	Cont.	Cont.

B. (U) DESCRIPTION: This program provides engineering development of modern oceanographic survey sensor technologies specifically developed in response to Fleet needs for tactical oceanographic data to support a variety of warfare areas and operations and systems.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Signed contract for series of A-size, 3 month buoys under Joint U.S./Canadian Defense Development Sharing Program (DDSP).
- b. (U) Completed Airborne Electro-Magnetic (AEM) Ice Thickness Measurement System prototype and conducted Arctic field test.
- c. (U) Continued development of Ice Penetrating Arctic Oceanographic Buoy (AOB) under Joint U.S./Canadian DDSP.
- d. (U) Completed Expendable Conductivity Temperature Depth Probe (XCTD) development.

2. (U) FY 1992 PROGRAM:

- a. (U) Test ambient noise sensor drifter, complete development of 300M Temperature Depth drifter, initiate wind speed/direction sensor development.
- b. (U) Conduct testing of AOB, Spring 92.
- c. (U) Conduct integration of drifting buoy data into fleet display and acquisition hardware.
- d. (U) Transition XCTD to NAVOCEANO.

3. (U) FY 1993 PLANS:

- a. Continue wind speed/direction development on mini-drifting buoys, transition Meteorological (MET), Ambient Noise Sensor (ANS), 300 meter tail mini-drifter to NAVAIR.
- b. (U) Initiate new sensors for ice penetration package in AOB.
- c. (U) Initiate 6.4 development of expendable optical probes.
- d. (U) Add wave sensor to drifting buoys.

4. (U) PROGRAM TO COMPLETION:

D. (U) WORK PERFORMED BY: IN-HOUSE: NRL-SSC, Stennis Space Center, MS (formerly NOARL). CONTRACTORS: Sparton of Canada, London, Ontario, Canada; U.S. Army Corps of Engineers, Cold Regions Research and Engineering Laboratory, Hanover, NH; METOCEAN Data Systems, Ltd., Dartmouth, Nova Scotia, Canada.

E. (U) RELATED ACTIVITIES: PE 0603704N, ASW Oceanography.

F. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: \$1.75M U.S./Canadian Defense Development Sharing Program (DDSP) agreement for joint development of ice penetrator (AOB). \$2.7M U.S./Canadian DDSP for development of mini-drifting data buoy, signed May 91. Cost sharing is 50% by Canada.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604707N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: THEATER MISSION PLAN CENTER

PROJECT NUMBER: X0798 PROJECT TITLE: OVER-THE-HORIZON TARGETING

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE Cont.	TOTAL PROGRAM Cont.
X0798	OTH-T	4,093	0	2,874		

B. (U) DESCRIPTION: The OTH-T program performs critical review and test of Space and Electronic Warfare (SEW) and Command, Control, Communications, Computers and Intelligence (C4I) systems that support employment of TOMAHAWK and HARPOON cruise missiles beyond the sensor range of the launch platform. The program office is responsible for developing and maintaining system level specifications and conducting interoperability testing to certify system compliance. Major at sea system test are also conducted under CNO Operational Test Project K-310. OUTLAW-series demonstration projects are conducted to transition advanced technologies and/or new OTH-T capabilities to the Fleet. The OTH-T Program also provides configuration control for Navy OTH-T/SEW systems.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Provided interoperability, architecture, and engineering support to Battle Groups deployed in support of operations DESERT SHIELD and DESERT STORM. This resulted in delaying OUTLAW VIKING to FY92 and OUTLAW HAWKEYE (TSD).

b. (U) Developed and deployed OTH-T Airborne Sensor Interface System (OASIS) and an improved OASIS II onboard P-3 aircraft.

c. (U) Developed and tested AN/APG-137(V) Inverse Synthetic Aperture Radar onboard SH-60B Helicopter (OUTLAW SEAHAWK).

d. (U) Provided Fleet System Engineering support to validate specific sensor-to-shooter targeting delivery paths within OTH-T architecture.

e. (U) Performed certification testing of 7 SEW/C4I/WCS systems at Reconfigurable Land-Based Test Site (RLBTS) IAW OPNAVINST 9410.5.

2. (U) FY 1992 PROGRAM: In FY92, the OTH-T program is being executed under Program Element 0604231N, Proj X0486 (ASWOC OTH-T).

3. (U) FY 1993 PLANS:

a. (U) Deploy OASIS for EP-3 (OUTLAW STORY TELLER) & S-3 (OUTLAW VIKING).

b. (U) Execute RADIANT OUTLAW (LADAR) Advanced Technology Demonstration, currently planned to be installed on a fleet P-3 aircraft.

c. (U) Provide Fleet SEW System Engineering support to validate specific sensor-to-shooter targeting delivery paths within OTH-T/SEW architectures.

d. (U) Conduct K-310 Fleet exercise.

e. (U) Conduct quarterly certification testing of 3-8 systems per test.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NOSC, San Diego CA and Kaneohe Bay, HI; NRL, Washington, DC; CONTRACTORS: JHU/APL, Laurel, MD; TIBURON Systems, San Jose, CA; DELFIN Systems, Sunnyvale, CA.

E. (U) RELATED ACTIVITIES: The OTH-T process encompasses a multitude of SEW/C4I systems from sensor to shooter and is supported by the following Program Elements: Program Element 0603763N, WSAGE; Program Element 0604367N, Tomahawk Missile System; Program Element 0303109N, Satellite Communications; Program Element 0602111N, AAM/ASUW Technology; Program Element 0603451N, Tactical Space Operations; Program Element 0603717N, Command & Control Systems; Program Element 0604230N, Warfare Support Systems.

F. (U) OTHER APPROPRIATION FUNDS: None.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604710N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: NAVY ENERGY PROGRAM (ENG)

PROJECT NUMBER: R0371 PROJECT TITLE: Energy Conservation (ENG)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COM- PLETE	TOTAL PROGRAM
R0371	ENERGY CONSERVATION (ENG)	3,415	3,361	4,026	Cont.	Cont.

B. (U) DESCRIPTION: Develop energy-efficient systems and practices for ships, facilities, and aircraft. Resulting energy efficiency gains contribute to fleet sustainability, combat capability (e.g., greater range, time on station), and reduced costs. Efforts include fuel use optimization aids for aircraft; antifouling paints, air conditioning and lighting for ships; adaptation of DOE/commercial energy conservation and renewable energy technologies to facility needs. Provide test and evaluation support to the companion PE 0603724N Proj R0829.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- The pre-flight planning system: "Flight Optimization Routines for Energy Management (FOREM)" became operational and was used extensively by F/A-18, A-6E, F-14A, and A-7E aircraft for mission fuel planning and fuel use optimization during operations DESERT SHIELD/DESERT STORM.

- Developed methods to maximize the life of ablative copper anti-foulant (AF) paints in fleet use. Retention of functioning AF paint systems on CVN65, CVN70, and DD997 produced immediate savings of \$2.2M.

- High efficiency lighting specified by NAVSEA for installation on all new construction ships commencing with hull DDG68.

- Published selection criteria for high efficiency electric motors and steam traps for shore facilities. Developed design parameters for large photovoltaic (PV)/diesel stand-alone hybrid power systems.

2. (U) FY 1992 PROGRAM:

- FOREM becomes available to additional aircraft: EA-6B, KC-130R/T, E-2C. Enhancements will be completed for F/A-18 and A-6E. Integrated flight performance advisory system (FPAS) will become operational on F/A-18C/D. Initiate FPAS development for F/A-18's with new engine (increased thrust).

- Continue ship testing of most promising advanced AF paint systems and support of fleet underwater hull maintenance programs. Continue SHIPEVAL of DC fluorescent lighting systems on CG48 and DD979.

- Develop and test pierside and facility electric power metering and conditioning systems. Design PV/diesel large hybrid power system and prepare T&E Plan for San Clemente field test.

3. (U) FY 1993 PLANS:

- Complete development of pocket-sized aircraft performance advisory computer (P-S APAC) for E-2C, C-2A, K-130F. Complete enhanced system for P-3B/C. Complete fleet requested enhancements to FOREM for F-14A and KC-130R/T. Initiate FOREM enhancements for E-2C, EA-6B, TA-4J, P-3C. Complete FPAS mod for F/A-18's with F404-GE-402 engine.

- Complete SHIPEVALS of advanced DC lighting systems. Continue ship testing of most promising advanced AF paint systems and develop maintenance procedures to maximize service life and effectiveness.

- Transition pierside and facility electric power metering and conditioning systems to field use and monitor performance. Provide application-specific technical support to MILCON photovoltaic power system investment programs. Continue development of industrial process energy saving technologies begun in 6.3. Field test large PV/diesel hybrid power system.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: DTRC, Annapolis, MD; NADC, Warminster, PA; NCEL, Port Hueneme, CA; NWC, China Lake, CA. CONTRACTORS: York Intl., York, PA; IOTA Eng., Tucson, AZ; McDonnell Douglas, St. Louis, MO.

E. (U) RELATED ACTIVITIES: PE 0603724N, Navy Energy Prog. (Adv).

F. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: N/A

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604714N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: AIR WARFARE TRAINING DEVICES
PROJECT NUMBER: W2124 PROJECT TITLE: AIR WARFARE TRAINING DEVELOPMENT

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W2124 AIR WARFARE TRAINING DEVELOPMENT	-0-	827	2,119	4,058	7,004

B. (U) DESCRIPTION: This program develops Universal Threat System for Simulators (UTSS) which is designed to provide current threat simulation to a wide range of aircrew simulators in three services, using a common threat module and standard threat database. Historically, each different simulator has required development and maintenance of a separate threat generation system. Development of the standardized UTSS will provide more current threat representation and will eliminate redundant efforts and expense. UTSS will be incorporated on existing and future Navy aircrew Flight Trainers, Tactics Trainers and Weapons System Trainers. UTSS is a Navy-led, tri-service program through the Joint Technical Coordination Group - Training Systems Development.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Not applicable.
2. (U) FY 1992 PROGRAM: Develop common, validated electronic warfare threat environment technical data base for use in aircrew flight trainers and weapons systems trainers.
3. (U) FY 1993 PLANS: Issue RFP. Award contract for UTSS prototype. Build and test prototype UTSS module and database.
4. (U) PROGRAM TO COMPLETION: Complete FSED. Validate threat data and models. Develop protocols for applicable simulators. Enter Production Phase. Incorporate UTSS on new trainers and upgrade existing trainers.

D. (U) WORK PERFORMED BY: IN-HOUSE: Naval Air Development Center, Warminster, PA; Naval Training Systems Center, Orlando, FL; Air Force Human Resources Lab, Dayton OH. CONTRACTORS: TBD.

E. (U) RELATED ACTIVITIES: UTSS is a tri-service program.

F. (U) OTHER APPROPRIATION FUNDS: Procurement funds are within the APN-7 Common Ground Equipment line item (P-1 item 59).

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604715N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Surface Warfare Training Devices

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1991 ACTUAL	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
S1427	Surface Tactical Team Trainer	12,800	10,646	3,100	8,900	77,580
S1834	Landing Craft Air Cushion (LCAC) Operator Trainer	1,327	0	0	0	28,724
	Total	14,127	10,646	3,100	8,900	106,304

B. (U) DESCRIPTION: This program improves Surface Warfare readiness and training. It addresses requirements of the Fleet and Chief of Naval Education and Training for development of prototype surface warfare training devices to provide or improve training, operational readiness, efficiency and safety, and to reduce training time and costs.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604715N

BUDGET ACTIVITY: 4

PROJECT ELEMENT TITLE: Surface Warfare Training Devices

PROJECT NUMBER: S1427 PROJECT TITLE: Surface Tactical Team Trainer

C. (U) DESCRIPTION: The project task will be to develop a generic training system to replace obsolete devices currently in operation. The project will provide team procedural and tactical training and evaluation in a multi-threat environment for conventional and tactical data equipped ships. The devices developed in this project will have a direct impact on the Navy's ability to train for battle. 20A66 ASW Tactical Team Trainer - will replace the ASW Coordinated Tactics Trainers (X14A6 and 14A6) built in the 1960's, and provide multiple platform/multi-threat procedural, tactical and decision-making training for single units up to battle group size. The Trainer will be composed of multiple surface ship, submarine, and aircraft "command centers". Battle Force Tactical Training (BFTT) - will consist of expanding the Combat Information Center (CIC) training concept by developing prototype surface ship combat system trainers and integrating these trainers into a shipboard training network.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Continued 20A66 Lot I development with emphasis on software development and initial hardware interfacing.
- b. (U) Conducted Device 20A66 Software Critical Design.

2. (U) FY 1992 PROGRAM:

- a. (U) Finalize and award contract for embedded training capability of LINK 11.
- b. (U) Complete Software Critical Design Review, in June 1992.
- c. (U) Continue Hardware/Software integration and begin system testing in plant. Complete 20A66 development.

3. (U) FY 1993 PLANS:

- a. (U) Develop and demonstrate BFTT pre-production shipboard systems.
- b. (U) Develop and demonstrate BFTT scenario generation, control and display enhancements.
- c. (U) Provide systems engineering for definition of BFTT training network requirements.

4. (U) PROGRAM TO COMPLETION: Continue BFTT efforts.

E. (U) WORK PERFORMED BY: IN-HOUSE: Naval Training Systems Center, Orlando, FL; Naval Oceanographic Systems Command, San Diego, CA; Naval Ship Weapon Systems Engineering Station, Port Hueneme, CA. CONTRACTORS: Hughes, Long Beach, CA.

F. (U) RELATED ACTIVITIES: Not Applicable.

G. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) PROCUREMENT					
(OPN, RA-7/#225)	0	0	9,454	10,920	20,374
(OPN, RA-2/#90)	1,596	4,120	4,071	23,995	33,782

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604717M

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Marine Corps Combat Services Support

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C0079	CBT LOG SPT	1,769	107	249	CONT.	CONT.
C1983	Tactical Fuel	1,103	0	0	0	1,103
	TOTAL	2,872	107	249	CONT.	CONT.

B. (U) DESCRIPTION: This program element provides modernization of engineering tool sets, chests and kits, engineering equipment, tactical fuel system equipment, utilities equipment, computer-aided construction planning, estimating, and management. The program element also improves/develops tactical clothing/ equipment and fields medical equipment.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604717M

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Marine Corps Combat Services Support

PROJECT NUMBER: C0079 PROJECT TITLE: Combat Logistics Support (CBT LOG SPT)

C. (U) DESCRIPTION: This program provides modernization of engineering tool sets, chests and kits, engineering equipment, tactical fuel system equipment, utilities equipment, computer-aided construction planning, estimating, and management. The program also improves/develops tactical clothing/equipment and fields medical equipment.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Placed Manual X-Ray Processor in metal casings able to withstand shock vibration, dust, heat and humidity in a field environment.
- b. (U) Initiated development of the Field Clinical Laboratory.
- c. (U) Began testing on the individual mine field protective gear.
- d. (U) Procured test quantities of the combat glove.
- e. (U) Produced and tested prototypes of clearance blade for the Amphibious Assault Vehicle/7-A1. Completed Forward Area Water Distribution System.

2. (U) FY 1992 PROGRAM:

- a. (U) Select, test and field Marine Corps Field X-Ray Darkroom and X-Ray Machine.
- b. (U) Select and test prototypes for the Field Clinical Laboratory.
- c. (U) Complete testing on many cold weather items.

3. (U) FY 1993 PLANS:

- a. (U) Test/evaluate Field Clinical Laboratory, Medical Repair, Dental X-Ray equipment and Medical Shelters.
- b. (U) Develop the multipurpose helmet.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MARCORSYSCOM, Quantico, VA; NMRDC, Bethesda, MD; NCEL, Port Hueneme, CA; Natick RDE Center, Natick, MA; Human Engineering Lab, Aberdeen, MD. CONTRACTORS: Mercury Marine, Oshkosh, WI.

F. (U) RELATED ACTIVITIES: NONE.

G. (U) OTHER APPROPRIATION FUNDS: Programs will be fielded with O&M, MC dollars.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604718M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Intelligence/Electronics Warfare System
PROJECT NUMBER: C1463 PROJECT TITLE: Counterintelligence and Security Equipment

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C1463	Counterintelligence and Security Equipment	1,071	367	806	CONT.	CONT.

B. (U) DESCRIPTION: This project funds purchasing and user evaluation of non-developmental item (NDI) counterintelligence equipment and product improvement of the Counterintelligence Communication System (CCS). A continuing requirement exists to improve Marine Corps equipment in support of tactical counterintelligence special operations, human intelligence collection activities and Technical Surveillance Countermeasures (TSCM).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- (U) Continued Operational Test and Evaluation by counterintelligence teams.
- (U) Continued the Counterintelligence Communication System product improvement program (PIP).

2. (U) FY 1992 PROGRAM:

- (U) Support Navy Aviation Test Center Systems Design Improvement.
- (U) Conduct lithium battery aircraft safety certification test.
- (U) Conduct design analysis on improvements on antenna

3. (U) FY 1993 PLANS:

- (U) Conduct DT/OT test and evaluation of hardware firm ware for 2-way communication.
- (U) Test, integrate and continue other antenna improvements.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: CCS: NADC, Warminster, PA.
CONTRACTORS: NONE.

E. (U) RELATED ACTIVITIES: NONE.

F. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
(U) O&MMC	18	10	15	CONT.	CONT.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604719M

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Marine Corps Command/Control/Communications Systems

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C0053	JTIDS	6,623	2,232	3,916	CONT.	CONT.
C1929	ATACC	3,981	6,811	0	0	43,959
C2085	MAFATDS	4,256	7,924	8,231	CONT.	CONT.
	TOTAL	14,860	16,967	12,147	CONT.	CONT.

B. (U) DESCRIPTION: This program element provides funds for the engineering development of Marine Corps Command, Control, and Communications Systems which include Marine Tactical Command and Control Systems development and improvements. The projects are aimed toward more effective command and control of tactical forces during both amphibious and expeditionary land operations. This concept envisions an integrated air/ground tactical command and control system oriented toward amphibious expeditionary environment to meet the unique command, control and interoperability requirements of the Landing Force Commanders.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604719M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Command/Control/Communications Systems
PROJECT NUMBER: C0053 PROJECT TITLE: Joint Tactical Information
Distribution System (JTIDS)

C. (U) DESCRIPTION: JTIDS integrates the high capacity, jam resistant, secure, digital communications capability provided by the Class 2H terminal into designated host platforms-Tactical Air Operations Module (TAOM) and Advanced Tactical Air Command Central (ATACC).

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Continued development of the full scale engineering development (FSED) of the JTIDS interface box (JIB) and JTIDS module (JM).
- b. (U) Awarded contract for development of FSED JTIDS capable TAOM (JTAOM).
- c. (U) Continued the development of the Class 2H terminal.
- d. (U) Initiated efforts to integrate host platforms.

2. (U) FY 1992 PROGRAM: Integrate JTIDS into ATACC as a model for incorporation into all other air command and control systems (i.e. TAOM and Improved Direct Air Support Center (IDASC)).

3. (U) FY 1993 PLANS:

- a. (U) Complete JIB/JM FSED development.
- b. (U) Continue FSED JTAOM development.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MARCORSYSCOM, Quantico, VA; MCTSSA, MCB, Camp Pendleton, CA; NESEC, Vallejo, CA; ESD, Hanscom AFB, Bedford, MA. CONTRACTORS: GEC MARCONI, Wayne, NJ; Litton Data Systems, Van Nuys, CA; Grumman Data Systems, Springfield, VA.

F. (U) RELATED ACTIVITIES: Program Element 0604719M, Project C1929. Joint Program (Air Force lead service) on development of JTAOM.

G. (U) OTHER APPROPRIATION FUNDS: NONE.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604719M BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Marine Corps Command/Control/Communications Systems
PROJECT NUMBER: C2085 PROJECT TITLE: Multi-Service Advanced Field Artillery
Tactical Data System (MAFATDS)

C. (U) DESCRIPTION: This program was formerly titled FIREFLEX. MAFATDS will consist of the digital fire support Command and Control (C2) automated software, fielded on Marine Corps common hardware. MAFATDS will automate for the Marine commander the integration and coordination of supporting arms.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:

a. (U) Continued Advanced Field Artillery Tactical Data System (AFATDS) Version 1 (V1) software development.

b. (U) Completed System Design Review (SDR), Software Specification Review (SSR), and Preliminary Design Review (PDR).

c. (U) Utilized FMF Testbed to evaluate automated, digital C2 equipment, doctrine and procedures.

2. (U) FY 1992 PROGRAM:

a. (U) Continue AFATDS V1 software development.

b. (U) Complete the Critical Design Reviews (CDR I & II).

c. (U) Continue FMF Testbed operation and feed results into AFATDS development.

d. (U) Develop the AFATDS Version 2 (V2).

3. (U) FY 1993 PLANS:

a. (U) Complete Field Development Test & Evaluation.

b. (U) Continue work on V2 software.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: MCCDC and MARCORSYSCOM, Quantico, VA; MCTSSA, Camp Pendleton, CA; TSM, Fort Sill, OK. CONTRACTORS: Magnavox Systems, Inc., Fort Wayne, IN.

F. (U) RELATED ACTIVITIES: Program Element 0203726A, Advanced Field Artillery Tactical Data System (AFATDS), Project D322.

G. (U) OTHER APPROPRIATION FUNDS: NONE.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604721N

BUDGET ACTIVITY: 5

PROGRAM ELEMENT TITLE: Battle Group Passive Horizon Extension System

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	To COMPLETE	TOTAL PROGRAM
X2134	BGPHEB-ST	0	0	5,200	CONT.	CONT.
X2135	CHBDL-ST	0	0	2,000	CONT.	CONT.
	TOTAL	0	0	7,200	CONT.	CONT.

B. (U) DESCRIPTION: Battle Group Passive Horizon Extension System Surface Terminal (BGPHEB-ST) and the Common High Bandwidth Data Link Shipboard Terminal (CHBDL-ST) constitute the CV/CVN-based shipboard element of the BGPHEB system which uses remote receivers in the ES-3A's sensor payload to extend the Battle Group's line-of-sight radio horizon. BGPHEB-ST will be located in CV/CVN Ships Signal Exploitation Space (SSES), while CHBDL-ST controls topside antennas from Main Radio.

(U) Battle Group Passive Horizon Extension (BGPHEB) FY-91 efforts were funded with National Security Agency (NSA) funds. Efforts for the FY-92 program are funded under PE 0604231N/Project X0709. Common High Bandwidth Data Link - Shipboard is funded by the Airborne Reconnaissance Support Program (ARSP) in FY 1991 and PE 0604231N/Project X0709 (FY 1992).

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1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604721N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: Battle Group Passive Horizon Extension System
PROJECT NUMBER: X2134 PROJECT TITLE: BGPHERS-ST

C. (U) DESCRIPTION: Battle Group Passive Horizon Extension System Surface Terminal (BGPHERS-ST) extends the Battle Group's line-of-sight radio horizon by using remoted receivers in the ES-3A's sensor payload, via the Common High Bandwidth Data Link Shipboard Terminal (CHBDL-ST). BGPHERS-ST will be located in CV/CVN Ships Signal Exploitation Space (SSES). The BGPHERS-ST 4-position, 6-rack cryptologic control, analysis and reporting center uses Navy-standard DTC/TAC-series workstations and integral local intercept receivers. The design downsizes and corrects deficiencies from the 14-rack AN/SLQ-50(XN-1) model tested on USS EISENHOWER (CVN-69) during FY87 (factory verification completed in fall 1989). Development will proceed in two stages, first reducing risk by demonstrating operation with the ship's local receivers, then (timed to meet CHBDL-ST development) adding control and use of the remoted airborne payload.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Efforts funded with National Security Agency (NSA) funds.
2. (U) FY 1992 PROGRAM: Efforts funded under PE 0604231N/Project X0709, Navy Tactical Command System - Afloat.
3. (U) FY 1993 PLANS: Complete first stage development with integrated factory and at-sea testing.
4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVSWC, Dahlgren, VA; NAVELEXCEN, San Diego, CA; NAVELEXCEN, Charleston, SC; NAVELEXCEN, Portsmouth, VA. CONTRACTOR: E-Systems, Inc., Melpar Division, Falls Church, VA.

F. (U) RELATED ACTIVITIES: 0604721N, project X2135 and 0604231N, project X0709.

G. (U) OTHER APPROPRIATION FUNDS: Procurement funds are budgeted in the outyears.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604721N BUDGET ACTIVITY: 5
PROGRAM ELEMENT TITLE: BATTLE GROUP PASSIVE HORIZON EXTENSION SYSTEM
PROJECT NUMBER: X2135 PROJECT TITLE: COMMON HIGH BANDWIDTH DATA LINK-
SHIPBOARD TERMINAL (CHBDL-ST)

C. (U) DESCRIPTION: This project will procure, install and test the Common High Bandwidth Data Link-Shipboard Terminal (CHBDL-ST). The CHBDL-ST equipment will provide a common high bandwidth data link shipboard terminal for the receipt of signal and imagery intelligence data from remote airborne sensors and the transmission of link and sensor control data to airborne platforms.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Funded with Airborne Reconnaissance Support Program (ARSP) Office funds.

2. (U) FY 1992 PROGRAM: Funded under PE 0604231N/Project X0709

3. (U) FY 1993 PLANS:

a. (U) Complete fabrication and initiate in-plant acceptance testing of first system prior to shipment to land based test site (LBTS).

b. (U) Continue efforts to prepare LBTS and to coordinate end-to-end testing with interfacing airborne sensor and shipboard intelligence processing components.

c. (U) Definitize and negotiate options for fabrication of second system for early FY-94 options exercise.

d. (U) Second system will be used for environmental and reliability qualification testing at prime contractor's facilities.

4. (U) Program to Completion: This is a continuing program

E. (U) Work Performed by: In-House: NAVSWC, Dahlgren, VA; NESEC, Portsmouth, VA. Contractors: PARAMAX Systems Inc. (PRIME); Salt Lake City, UT; DATRON Corp, Simi Valley, CA (major sub).

F. (U) Related Activities: PE 0603261N Advanced Tactical Airborne Reconnaissance System (ATARS) and Joint Service Imagery Processing system - Navy (JSIPS-N) These sensor systems gather information that is transmitted over CHBDL-ST. The initial contract award funded the design and fabrication of one system using ARSP funds.

G. (U) Other appropriation funds: Not Applicable.

H. (U) International Cooperative Agreement: Not Applicable.

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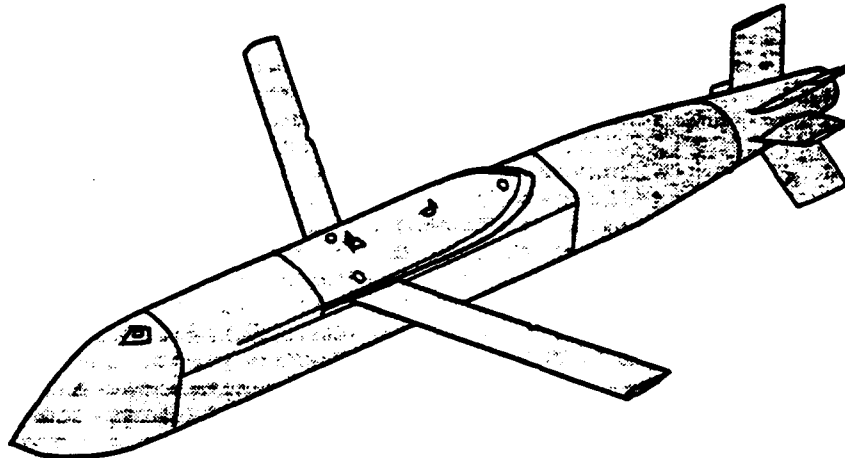
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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604727N BUDGET ACTIVITY: 4-Tactical Programs
 PROGRAM ELEMENT TITLE: Joint Standoff Weapon Systems
 PROJECT NUMBER: E2068 PROJECT TITLE: Advanced Interdiction Weapon System



POPULAR NAME: AIWS

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program Milestones		MS-II		CONT
BASELINE		APR/92		CONT
P3I				CONT
ENGINEERING MILESTONES			PDR	CONT
BASELINE			OCT/92	CONT
P3I				CONT
T&E MILESTONES				CONT
BASELINE	OT-I			CONT
	MAR-JUL/91			CONT
P3I				CONT
CONTRACT MILESTONES		E&MD		CONT
Baseline		APR/92		CONT
P3I				CONT

BUDGET (\$K)	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
Major Contract	4,648	34,071	48,300	Continuing
Support Contract	406	485	378	Continuing
In-House Support	10,297	8,389	9,614	Continuing
GFE/Other	1,000	9,901	8,618	Continuing
TOTAL	16,351	52,846	66,910	Continuing

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604727N BUDGET ACTIVITY: 4-Tactical Programs
PROGRAM ELEMENT TITLE: Joint Standoff Weapon System
PROJECT NUMBER: E2068 PROJECT TITLE: Advanced Interdiction Weapon System

B. (U) DESCRIPTION: The Advanced Interdiction Weapon System (AIWS) is an air-to-ground weapon designed to attack a variety of targets during day, night and adverse weather conditions. AIWS will enhance aircraft survivability as compared to current interdiction weapon systems by providing the capability for launch aircraft to standoff outside the range of most target area surface-to-air threat systems. The AIWS launch-and-leave capability will allow several target kills per aircraft sortie. AIWS will be integrated with Navy F/A-18, AV-8B, A-6 and A-X aircraft.

(U) The AIWS program will first develop a baseline weapon for use against fixed area targets. This weapon will be designed upfront for pre-planned product improvements (P3I) to enable the attack of blast/frag sensitive or moving point targets. The baseline AIWS variant will include a kinematically efficient airframe, an Integrated Inertial/Global Positioning System (GPS) navigation capability, and a BLU-97/B submunition payload. The P3I variant will add a terminal seeker, a man-in-the-loop data link, and a unitary warhead. P3I will provide increased accuracy and lethality, and the capability for aimpoint selection, target discrimination, and bomb impact assessment.

(U) Through adherence to MIL STDs 8591 and 1760, and minimized weight and dimension considerations, AIWS will have considerable potential for compatibility with Air Force or NATO aircraft. Acquisition agreements are being definitized with the Air Force to integrate the BLU-108 SKEET submunition into the baseline AIWS for use on F-16 and other Air Force aircraft, and also to ensure mid-course guidance and terminal seeker are common between AIWS and the USAF/USN Joint Direct Attack Munition (JDAM) programs.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS

- a. Completed Operational Testing (OT-I) Operational Assessment.
- b. Completed Demonstration/Validation (DEM/VAL).
- c. Conducted Engineering & Manufacturing Development (E&MD)

Source Selection.

2. (U) FY 1992 PROGRAM

- a. Milestone (MS) II Decision, Baseline
- b. Award E&MD Contract, Baseline
- c. Formalize Joint USN/USAF Requirements and

Acquisition Strategy (JSOW/JDAM)

3. (U) FY 1993 PLANS

- a. Continue E&MD efforts, Baseline
- b. Conduct Preliminary Design Review (PDR), Baseline
- c. Continue JSOW/JDAM efforts

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN HOUSE: NWC, China Lake, CA; PMTC, Ft Mugu, CA; MAC, Indianapolis, IN; NADC, WARMINISTER, PA.; NATC, Pax River, MD.
CONTRACTORS: Texas Instruments/LTV. Lewisville, TX.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604727N BUDGET ACTIVITY: 4-Tactical Programs
PROGRAM ELEMENT TITLE: Joint Standoff Weapon Systems
PROJECT NUMBER: E2068 PROJECT TITLE: Advanced Interdiction Weapon System

E. (U) COMPARISON WITH FY 1992/93 PRESIDENT'S BUDGET:

1. (U) Technology Changes: None
2. (U) Schedule Changes: The E&MD contract will be awarded April 1992, the PDR will now occur October 92 and DT-IIA has been moved to October 1993.
3. (U) Cost Changes: None

F. (U) PROGRAM DOCUMENTATION:

- | | |
|--|-------|
| a. Justification for Major System New Start | 12/85 |
| b. Operational Requirement (Currently being updated) | 03/88 |
| c. Acquisition Plan | 03/91 |
| d. Test & Evaluation Master Plan (Currently being updated) | 04/89 |
| e. Integrated Program Summary (Currently being prepared) | |

G. (U) RELATED ACTIVITIES: The Air Force has agreed to integrate the BLU-108 submunition (SKEET) as a payload for the AIWS baseline vehicle and to integrate on Air Force aircraft to provide a standoff delivery capability for the Sensor Fuzed Weapon. The Air Force has also agreed to participate in the AIWS P3I DEM/VAL pending clarification of JSOW/JDAM requirements.

(U) The AIWS Inertial Navigation Set/Global Positioning Receiver (INS/GPR) will be used as the guidance set for Project Element (PE) 0604618N Joint Direct Attack Munition (JDAM) program.

(U) A MOA between the Navy and Air Force was signed 15 July 1991 to address joint service interoperability and cooperation as a result of lessons learned in Operation Desert Storm and the declining defense budget. A more specific agreement is being negotiated by the Navy and Air Force detailing the JSOW/JDAM requirements and acquisition approach, to be completed in FY-92.

H. (U) OTHER APPROPRIATION FUNDS: Weapons Procurement, Navy (WPN) 1998

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) TEST AND EVALUATION: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604761N
PROGRAM ELEMENT TITLE: INTELLIGENCE

BUDGET ACTIVITY: 4

A. (U) RESOURCES: (DOLLARS IN THOUSANDS)

PROJ. NUMBER	TITLE	FY 91 ACTUAL	FY 92 EST.	FY 93 EST.	TO COMPLETE	TOTAL PROGRAM
R0809	E/O SENSOR DEV	21	0	0	0	687
Z0772	FMA/FME	5,502	2,014	1,965	CONT.	CONT.
	TOTAL	5,523	2,014	1,965	CONT.	CONT.

B. (U) DESCRIPTION:

(S) The Electro-Optic (E/O) sensor project develops unique equipment packages capable of collecting and analyzing information about electro-optic hardware. The purpose is to obtain fine-grained intelligence information and scientific and technical data for use in assessing

i:
i:

(U) Foreign material acquisition and exploitation (FMA/FME)

(U)

(U)

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604761N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: INTELLIGENCE

PROJECT NUMBER: 20772

**PROJECT TITLE: FOREIGN MATERIAL
ACQUISITION/EXPLOITATION**

C. (U) DESCRIPTION:

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- (a). (U)
- (b). (U)
- (c). (U)

- (d). (U)
- (e). (U)
- (f). (U)
- (g). (U)
- (h). (U)
- (i). (U)

2. (U) FY 1992 PROGRAM:

3. (U) FY 1993 PLANS:

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: In House: Naval Research Laboratory, Washington, D.C.; Naval Undersea Systems Center, Newport, R.I.; David Taylor Research Center, Carderock, MD.; Naval Undersea Warfare Engineering Station, Keyport, WA; Naval Air Test Center, Patuxent River, MD; Naval Weapons Support Center, Crane, IN.; Naval Coastal Systems Center, Panama City, FL; Naval Surface Warfare Center, Dahlgren, VA. Contractors: ITV/Vought Aerospace, Dallas, TX.

F. (U) RELATED ACTIVITIES: None.

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

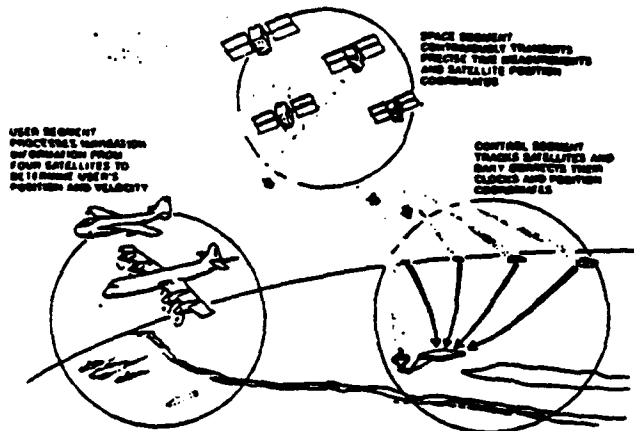
PROGRAM ELEMENT: 0604777N

BUDGET ACTIVITY: 5

PROGRAM ELEMENT TITLE: NAVSTAR Global Positioning System (GPS)

PROJECT NUMBER: X0921 PROJECT TITLE: NAVSTAR GPS Equipment

NAVSTAR GPS PROGRAM SEGMENTS



POPULAR NAME: NAVSTAR GPS

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program		MSIIB		
Milestones		2ND OTR		
Engineering				
Milestones				
T&E	COMPLETE			COMPLETE
Milestones	OT IIC BEGIN OT III			OT III
Contract				
Milestones				

BUDGET (\$K)	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
Major				
Contract	21.175	25.188	28.529	Continuing
Support				
Contract	470	759	768	Continuing
In-House				
Support	27.127	21.602	18.489	Continuing
GFE/ Other	688	2.374	4.593	Continuing
Total	49.460	49.923	52.379	Continuing

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604777N

BUDGET ACTIVITY: 5

PROGRAM ELEMENT TITLE: NAVSTAR Global Positioning System (GPS)

PROJECT NUMBER: X0921 PROJECT TITLE: NAVSTAR GPS Equipment

B. (U) DESCRIPTION: GPS is a space-based radio positioning and navigation system that provides users with worldwide, all-weather, three-dimensional position, velocity and precise time data based on a constellation of 21 or more satellites. GPS provides a common navigation grid for land, air and sea units for coordinated operations. Navy's portion of the GPS program develops user equipment and provides for the integration and testing of this equipment on each class of aircraft, ship and submarine, as well as for the planning necessary to support the equipment when introduced into the fleet.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Began integration engineering on the SH-2G, H/KC-130 and F-14D aircraft.
- b. (U) Continued integration engineering on the A-6E, AV-8B, SH-60F Update (UD), EA-6B, OV-10D, VH-3D, MH-53E, P-3C UDIII, S-3, ES-3A UD, VH-60 and F/A-18 aircraft.
- c. (U) Completed integration engineering on the SH-60B, HH-65, E-2C and HU-25 aircraft and PFG-7 ship.
- d. (U) Began GPS integration with shipboard command and control systems.
- e. (U) Began Miniaturized Airborne GPS Receiver (MAGR) test and evaluation.
- f. (U) Completed Digital-to-Analog Converter (DAC) development.
- g. (U) Completed operational testing required to verify suitability of recently incorporated improvements.
- h. (U) Continued systems integration in the Electrically Suspended Gyro Navigator (ESGN), Carrier Navigation System (CVNS), Combat Direction System (CDS) and AN/WSN-5.
- i. (U) Began integration of GPS into Tactical Aircraft Mission Planning System (TAMPS) software.
- j. (U) Evaluated candidate embedded GPS and began development of industry guidelines.
- k. (U) Continued efforts in the areas of integration design support, data reduction, platform test support, deficiency resolution and user equipment design analysis.
- l. (U) Began demonstration of shipboard Tactical Air Navigation (TACAN) replacement with GPS.
- m. (U) Began OT-III on aircraft.

2. (U) FY 1992 PROGRAM:

- a. (U) Begin integration engineering on the CH-53E, UH-1N, AH-1, EP-3 UD, HH-60H/J, F-14A, T-45, E-6A UD, C-2A, CH-46, SH-3H and UC-12 aircraft.
- b. (U) Continue integration engineering on the OV-10D, P-3C UDIII, SH-2G, MH-53E, H/KC-130, A-6E, SH-60F UD, ES-3A UD, EA-6B, VH-3D, S-3, F-14D, F/A-18 and AV-8B aircraft.
- c. (U) Complete integration engineering on the VH-60 aircraft.
- d. (U) Continue GPS integration with shipboard command and control systems through the Navigation Sensor System Interface (NAVSSI).
- e. (U) Continue MAGR test and evaluation.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604777N

BUDGET ACTIVITY: 5

PROGRAM ELEMENT TITLE: NAVSTAR Global Positioning System (GPS)

PROJECT NUMBER: X0921 PROJECT TITLE: NAVSTAR GPS Equipment

f. (U) Continue efforts in the areas of integration design support, data reduction, platform test support, deficiency resolution and user equipment design analysis.

g. (U) Continue shipboard TACAN replacement demonstration.

h. (U) Continue development of TAMPS software.

i. (U) Continue testing of embedded GPS.

j. (U) Continue systems integration in the ESGN.

k. (U) Complete systems integration in the CVMS, CDS and AN/WSN-5.

3. (U) FY 1993 PLANS:

a. (U) Begin integration engineering on the C-20, C-9, and RP-3 UD aircraft.

b. (U) Continue integration engineering on the S-3, F-14D, SH-2G, T-45, C-2A, A-6E, UC-12, SH-3H, C-20, AV-8B, ES-3A UD, H/KC-130, OV-10D, UH-1N, AH-1, EP-3 UD, HH-60H/J, F-14A and CH-46 aircraft.

c. (U) Complete integration engineering on the SH-60F UD, EA-6B, VH-3D, F/A-18, E-6A UD, CH-53E, MH-53E and P-3C UDIII aircraft.

d. (U) Complete MAGR test and evaluation.

e. (U) Continue GPS integration with shipboard command and control systems.

f. (U) Continue systems integration in the ESGN.

g. (U) Complete shipboard TACAN replacement demonstration.

h. (U) Complete development of TAMPS software.

i. (U) Complete testing of embedded GPS.

j. (U) Continue efforts in the areas of integration design support, data reduction, platform test support, deficiency resolution and user equipment design analysis.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Air Force Systems Command (Space Systems Division), Joint Program Office, Los Angeles, CA; NCCOSC (RDT&E Division), Warminster, PA; NAWC (Aircraft Division), Indianapolis, IN/Patuxent River, MD; NAWC (Weapons Division), China Lake, CA; NAVAVNDEP, Pensacola, FL/San Diego, CA. CONTRACTORS: Grumman Aerospace Corp., Long Island, NY; Boeing Company, Seattle, WA; McDonnell Douglas, St. Louis, MO.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: None

2. (U) SCHEDULE CHANGES: MS IIIB has been delayed by DoD to 2nd Qtr FY 92 for administrative reasons.

3. (U) COST CHANGES: None

F. (U) PROGRAM DOCUMENTATION:

1. Joint Acquisition Plan

Dec 1989

2. Multi-Service TEMP

Dec 1991

3. Joint ILS Plan

Jul 1991

4. Navy Training Plan

Oct 1991

5. DCP/IPS

Dec 1991

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604777N BUDGET ACTIVITY: 5
 PROGRAM ELEMENT TITLE: NAVSTAR Global Positioning System (GPS)
 PROJECT NUMBER: X0921 PROJECT TITLE: NAVSTAR GPS Equipment

G. (U) RELATED ACTIVITIES:

1. Program Element 0603203F (Advanced Avionics for Aircraft)
2. Program Element 0603601F (Conventional Weapons Technology)
3. Program Element 0305164F (NAVSTAR GPS User Equipment)

These are Air Force program elements that contribute to the development and test of GPS receivers and associated peripheral equipment.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
OPN (P-1 LI #86)	6,607	16,933	13,216	Continuing	Continuing
APN *	1,099	2,018	2,646	Continuing	Continuing
APN *	0	31,936	66,139	Continuing	Continuing
APN *	370	23,991	7,678	Continuing	Continuing
SCN	1,434	1,418	1,419	Continuing	Continuing

* These are composed of multiple P-1 Line Items.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENT: Not Applicable.

J. (U) TEST AND EVALUATION DATA:

Standard GPS User Equipment
 OT IIC Completed Jul 91
 CT III Complete FY 94

Remarks: Exceeded reliability requirements by a factor of four. Five-channel user equipment found operationally suitable and effective; OPTVFOR has recommended for fleet use. FOT&E to extend applications to 44 aircraft types has begun and will continue through FY 94.

Miniaturized Airborne GPS Receiver
 DT/OT Begin Feb 92
 Complete Sep 92

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604780H BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Joint Interoperability of Tactical Command and Control Systems, Marine Corps
PROJECT NUMBER: C1079 PROJECT TITLE: Joint Interoperability of Tactical Command and Control Systems (JINTACCS)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C1079	JINTACCS	1,005	783	995	CONT.	CONT.

B. (U) DESCRIPTION: This program supports Marine Corps participation in the Joint Chiefs of Staff (JCS)-sponsored JINTACCS program which provides for the development of joint character and bit-oriented message standards and procedures.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Participated in the development of Volume IV of the Variable Message Format Technical Interface Design Plan (VMF TIDP), and Tactical Digital Information Link (TADIL) J as a joint standard.

b. (U) Conducted Joint Tactical Air Operations (JTAO) recertification of the Tactical Air Operations Central (TAOC) and certification of the Marine Air Traffic Control and Landing System (MATCALs).

c. (U) Enhanced the U.S. Message Text Format (USMTF) Editor.

2. (U) FY 1992 PROGRAM:

a. (U) Continue the system engineering effort in the development of change proposals to VMF, TADIL J, and USMTF as evolving joint standards.

b. (U) Continue JTAO recertification of the TAOC and MATCALs.

c. (U) Participate in the JTAO testing and certification of other joint Command, Control, and Communication Information (C3I) Systems.

d. (U) Enhance the USMTF Editor.

3. (U) FY 1993 PLANS:

a. (U) Continue the system engineering effort in the development of change proposals to VMF, TADIL J, and USMTF as evolving joint standards.

b. (U) Begin joint testing and certification of TADIL J C3I Systems.

c. (U) Continue JTAO recertification of the TAOC and MATCALs.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: JTC3A, Reston, VA; MARCORSYS COM, Quantico, VA; MCTSSA, MCB, Camp Pendleton, CA. CONTRACTORS: Eagle Technology, Inc., Dumfries, VA; NSR Corp., Colorado Springs, Co.

E. (U) RELATED ACTIVITIES: Program Elements: 0604719H, JTIDS and Advanced Tactical Air Command Central (ATACC); and 0206626H, Tactical Air Operations Module (TAOM).

F. (U) OTHER APPROPRIATION FUNDS: NONE.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

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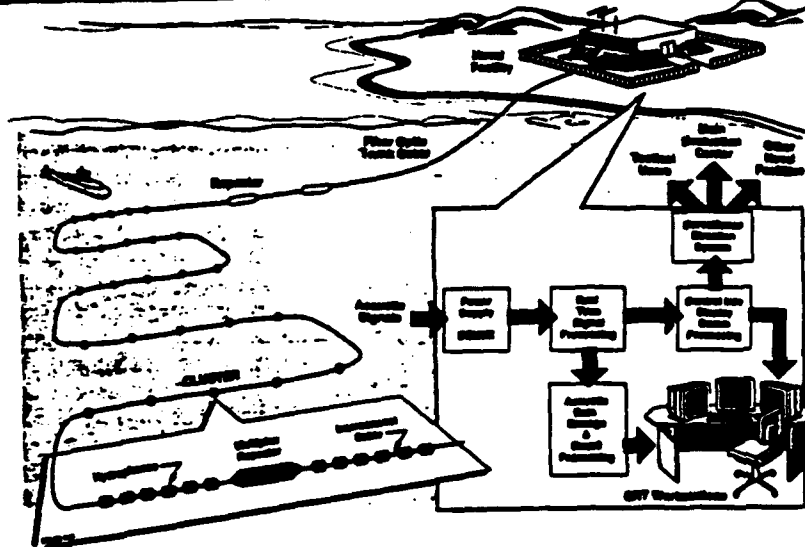
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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604784N BUDGET ACTIVITY: 4
 PROGRAM ELEMENT TITLE: Fixed Distributed System (FDS)
 PROJECT NUMBER: X1312 PROJECT TITLE: Fixed Distributed System (FDS)



POPULAR NAME: FDS

A. (U) SCHEDULE/BUDGET INFORMATION: (Dollars in Thousands)

SCHEDULE	FY 1991	FY 1992	FY 1993	TO COMPLETE
Program Milestones				
EDM IOC				
MS-III				3 Qtr FY96
Engineering Milestones				
PDR (Shore Segment)	12/90			
CDR (Shore Segment)				
T&E Milestones				
DT-2A (Phase 1-2/3)				
DT-2B (Phase 1/2/3)				
DT-2F (TECHEVAL)				
OT-2 (OPEVAL)				
Contract Milestones				
FDS Shore FSED		2/92		
BUDGET (\$K)				
	FY 1991	FY 1992	FY 1993	PROGRAM TOTAL TO COMPLETE
Major Contract	186,714	226,027	140,598	Cont./Cont.
Support Contract	0	0	0	Cont./Cont.
In-House Support	15,903	11,569	13,888	Cont./Cont.
GFE/Other	0	0	0	Cont./Cont.
Total	202,617	237,596	154,486	Cont./Cont.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604784N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Fixed Distributed System (FDS)

PROJECT NUMBER: X1312

PROJECT TITLE: Fixed Distributed System (FDS)

B. (U) DESCRIPTION: The Fixed Distributed System (FDS) is part of the Integrated Undersea Surveillance System (IUSS). IUSS provides the

FDS is a

The FDS underwater system builds on commercial fiber-optic technology for high data capacities, long trunk cable lengths and extremely high reliability. FDS is designed to be low power, small in diameter and use flexible components, allowing deployment of systems from non-traditional or covert platforms.

Shore processing will be workstation based using Non-Development Item (NDI) hardware throughout and the software will be coded in Ada. This FDS processing will form the framework and architecture for all IUSS processing requirements to be procured in the future. The FDS program has begun a major initiative to begin the development of an Advanced Deployable System (ADS).

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Conducted Shore Signal Information Processing Segment (SSIPS) Preliminary Design Review (PDR).
- b. (U) Fabricated Engineering Development Model (EDM) Underwater Segment (UWS) shore terminus (demultiplexer and HVPS).
- c. (U) Manufactured and tested First Article Deep Water Trunk (DWT) Cable and conducted Production Readiness Review (PRR) for DWT Cable.
- d. (U) Performed environmental and acoustic surveys to support design and installation of first production clusters and fields.
- e. (U)
- f. (U) Began equipment installation at UWS Integration Facility.
- g. (U) Conducted final
- h. (U) Conducted deployment snipe
- i. (U) Made investment to support ADS concepts.
- j. (U) Initiated FDS-Deployable (FDS-D) development.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604784N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Fixed Distributed System (FDS)
PROJECT NUMBER: X1312 PROJECT TITLE: Fixed Distributed System (FDS)

2. (U) FY 1992 PROGRAM:

- a. (U) Award competitive SSIPS Engineering and Manufacture Development (E&MD) contract.
- b. (U) Conduct SSIPS Critical Design Review (CDR) (hardware portion of CDR completed December 1991) and begin software development.
- c. (U) Complete installation of UWS integration facility equipment
- d. (U) Initiate assembly
- e. (U) Start installation
- f. (U) Conduct
- g. (U) Conduct
- h. (U) Begin deliveries
- i. (U) Conduct
- j. (U) Lease ship and conduct
- k. (U) Commence
- l. (U) Solicit from industry concept studies for ADS.
- m. (U) Continue engineering development of FDS-D.

3. (U) FY 1993 PLANS:

- a. (U) Conduct incremental software testing and evaluation on SSIPS.
- b. (U) Begin integration of hardware and software of shore processing segment.
- c. (U) Complete production
- d. (U) Continue deployment
- e. (U) Begin outfitting unique IUSS hardware.
- f. (U) Complete
- g. (U)
- h. (U) Complete ADS concept studies
- i. (U) Continue development of FDS-L

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: In-house: NOSC, San Diego, CA; NCEL, Port Hueneme, CA; NRL, Washington, DC. Contractors: AT&T Technologies, Inc., Greensboro, NC; AT&T/Bell Laboratories, Whippany, NJ; IBM Corporation, Manassas, VA; TRW, Inc., McLean, VA; AMRON, INC., Falls Church, VA; Simplex Wire and Cable Company, Portsmouth, NH; STC Submarine Systems, Inc, Portland, OR.

E. (U) COMPARISON WITH 1992/93 PRESIDENT'S BUDGET:

- 1. (U) TECHNICAL CHANGES: Not Applicable.
- 2. (U) SCHEDULE CHANGES: Not Applicable.
- 3. (U) COST CHANGES: -\$39.0M in FY93 resulted in reduced FDS development to reflect repricing based on actual contract value of SSIPS E&MD.

F. (U) PROGRAM DOCUMENTATION:

Decision Coordination Paper (DCP)	10 May 1989
Milestone II Decision/Acquisition Program	22 Sep 1989
Baseline	
ILSP Revised	30 Apr 1991
Acquisition Plan #91-18, FDS	14 Aug 1991
TEMP Revised/Approved	30 Sep 1991
Baseline Revised	Feb 1992

G. (U) RELATED ACTIVITIES: PE 0204311N, Integrated Undersea Surveillance Systems (IUSS).

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0604784N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: Fixed Distributed System (FDS)

PROJECT NUMBER: X1312

PROJECT TITLE: Fixed Distributed System (FDS)

- H. (U) OTHER APPROPRIATION FUNDS: Not Applicable.
- I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.
- J. (U) TEST AND EVALUATION DATA: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605151M BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Studies and Analysis Support, Marine Corps
PROJECT NUMBER: C0030 PROJECT TITLE: Studies and Analysis, Marine Corps

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C0030	Studies and Analysis	2,044	1,890	1,958	CONT.	CONT.

B. (U) DESCRIPTION: This program provides analytical foundation for the Marine Corps Studies System (MCSS). It supports the Concept Based Requirements System (CBRS), Mission Area Analysis (MAA) requirements, Program Objective memorandum (POM) initiatives, and validation of the Marine Corps' Marine Air Ground Task Force (MAGTF) Master Plan. This program provides quantitative information to decision makers on which to base improvements to doctrine, training and education, force structure and procurement. It also provides analytical support for the resolution of current problems identified by the operating forces.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Executed 80% (45 of 56 studies) of approved FY 1991 Marine Corps Studies Master Plan; included were the continuation of 10 FY 1990 studies. Several of the ongoing studies were modified to incorporate Operation Desert Shield/Storm analytical requirements.

b. (U) Ten studies were completed including the Marine Corps Long-Range Technology Assessment, the Tactical Directed Energy Warfare Study, Battlefield Assessment Study (Phase I), and 3 Mission Area Analyses.

2. (U) FY 1992 PROGRAM: The approved FY 1992 Marine Corps Studies Master Plan includes the continuation of 15 ongoing FY 1991 studies (e.g. the Amphibious Assault Study) and the initiation of approximately 50% (18 studies) of the 36 approved new study initiatives (e.g. the Artillery Mission Area Analysis).

3. (U) FY 1993 PLANS:

a. (U) Execute the approved Marine Corps Studies Master Plan for FY 1993 to include the Assault Support and Air Communications/Command/Control Studies.

b. (U) Fund the continuation of an estimated 8 continuing FY 1992 study initiatives.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Marine Corps Working Groups and Department of Defense Top Level Schools. CONTRACTORS: Dedicated IQC and other SBA contractors.

E. (U) RELATED ACTIVITIES: Program Element 0605154N, Center for Naval Analyses, Project C0031.

F. (U) OTHER APPROPRIATION FUNDS: NONE.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605152N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Studies and Analysis Support, Navy

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
MO106	Naval Medical Support Capability	103	113	*	*	*
R0132	CNO Program Analysis and Evaluation	673	489	503	Cont	Cont
R0133	National Academy of Sciences/Naval Studies Board	820	690	724	Cont	Cont
R0147	Operational Strategy/Tactical Effectiveness Analysis	732	767	788	Cont	Cont
R2040	Foreign Ship and Submarine Vulnerability (SSVP) Program	765	1,123	1,271	Cont	Cont
R2097	Manpower Personnel & Training	0	401	385	Cont	Cont
W2092	Naval Aviation Studies	2,700	1,802	2,009	Cont	Cont
TOTAL		5,793	5,385	5,680	Cont	Cont

* Transferred to the Consolidated Defense Health Program (PE 0605152D)

B. (U) DESCRIPTION: This program provides analytical support to the Secretary of the Navy (SECNAV) and the Chief of Naval Operations (CNO) as a basis for major policy, planning, and acquisition program execution decisions. It supports research and development strategy development and planning. It supports studies in the areas of manpower, personnel and training, and aviation. It develops analytical tools for evaluating effectiveness of U.S. weapons against potential foreign threat ships and submarines.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605152N **BUDGET ACTIVITY:** 6
PROGRAM ELEMENT TITLE: Studies and Analysis Support, Navy
PROJECT NUMBER: M0106 **PROJECT TITLE:** Naval Medical Support Capability

C. (U) DESCRIPTION: The Navy Medical Command has an ongoing need for evaluation of resource management techniques. This project provides an essential management tool to examine and investigate biomedical operations, functions, allocations of resources, personnel training, detailing, and other problems that may affect the relevancy, effectiveness, and efficiency of medical support of the Navy and Marine Corps.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Identified factors associated with the retention of Dental Officers and develop intervention strategies to compete more effectively with the private sector.

b. (U) Identified medical information requirements to manage more effectively the delivery of health care aboard ships by examining the feasibility of the use of Shipboard Automated Medical System.

2. (U) FY 1992 PROGRAM:

a. (U) Complete studies of factors associated with the retention of Dental Officers and develop intervention strategies to compete more effectively with the private sector.

b. (U) Complete identification of medical information requirements to manage more effectively the delivery of health care aboard ships by having examined the feasibility of the use of the Shipboard Automated Medical System.

3. (U) FY 1993 PLANS: Not applicable. This program has been transferred to the Consolidated Defense Health Program (PE 0605152D).

4. (U) PROGRAM TO COMPLETION: Transfers to P.E. 0605152D in FY-93.

E. (U) WORK PERFORMED BY: IN-HOUSE: Naval Health Research Center, San Diego, CA; Naval School of Health Sciences, Bethesda, MD.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605152N

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE: Studies and Analysis Support, Navy

PROJECT NUMBER: R0132 PROJECT TITLE: Program Analysis and Evaluation

C. (U) DESCRIPTION: This project provides analytical support to CNO and SECNAV in evaluation of overall balance within total Navy programs. Includes such tasks as (a) evaluation of force capabilities and requirements, (b) analysis of effectiveness of systems under development, and (c) SECDEF directed parametric cost analyses of major Navy programs. Deliverables consist of formal, structured documents containing or leading to conclusions and/or recommendations.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Continued research and analysis, providing results in support of Navy program decision making. Areas of research included sealift enhancement capability, manpower quality to unit readiness, ordnance sustainability, and surface ship readiness measures. Initiated research to evaluate Navy manpower mix and opportunities for restructuring, and to forecast and model Navy combat casualty rates.

2. (U) FY 1992 PROGRAM:

a. (U) Conduct analyses over a broad range of issues -- from the assessment of application for new technology to the development and testing of improved tactics for today's forces.

b. (U) Research to include continuing efforts to enhance understanding and analysis of a variety of sustainability and readiness programmatic issues.

3. (U) FY 1993 PLANS: Conduct analyses covering a broad range of topics, including development of output measures of training effectiveness, to assist the Navy in working optimized programming decisions for training purposes, and analyses of reserve force manning to identify and develop the number of reserve units supportable by pretrained manpower pools.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: CONTRACTORS: PRESEARCH Inc., Arlington, VA; Stanley Associates, Arlington, VA; ERC, McLean, VA; Synergy Inc., Washington, D.C.; RCI, Vienna, VA; KETRON, Inc., Malvern, PA; MATHTECH, Inc., Falls Church, VA.

F. (U) RELATED ACTIVITIES: Program Element 0605151M, (Studies and Analysis Support, Marine Corps); Program Element 0605154N, (Center for Naval Analyses, Navy).

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605152 BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Studies and Analysis Support, Navy
PROJECT NUMBER: R0133 PROJECT TITLE: National Academy of Sciences/
Naval Studies Board

C. (U) DESCRIPTION: As mutually agreed upon between the Chief of Naval Operations and the President of the National Academy of Sciences and with appropriate attention to the influence of the domestic economy, national objectives, social imperatives and anticipated military requirement, the Board for Naval Studies will conduct and report upon surveys and studies in the field of scientific research and development applicable to the operation and function of the Navy. Reports consist of a briefing to the Assistant Secretary of the Navy (Research, Development and Acquisition) (ASN(RDA)) and the Chief of Naval Operations and staff, and written technical reports at the conclusion of each stage of the study (at least annually) as an archival contribution of the Board. This program also funds specific studies in support of the Secretary of the Navy in high priority areas, dealing with policy matters and planning and acquisition decisions.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Completed the Future Carrier Technology study.
- b. (U) Conducted studies in scientific research and development.
- c. (U) Provided support for C. H. Davis Lecture series.

2. (U) FY 1992 PROGRAM:

- a. (U) Conduct in-depth study of selected emerging technologies.
- b. (U) Provide support for Naval Hydrodynamics Symposium series.
- c. (U) Support research and development strategy development.
- d. (U) Conduct studies in support of ASN(RDA).

3. (U) FY 1993 PLANS:

- a. (U) Continue in-depth study of selected emerging technologies.
- b. (U) Provide support for C. H. Davis Lecture series.
- c. (U) Provide support for R&D strategy development and planning.
- d. (U) Conduct studies in support of ASN(RDA).

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: Naval Ocean Systems Center, San Diego, CA; Naval Postgraduate School, Monterey, CA; Naval War College, Newport, RI.
CONTRACTORS: National Academy of Sciences, Washington, D.C.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605152N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Studies and Analyses Support, Navy
PROJECT NUMBER: R0147 PROJECT TITLE: Operational Strategy/
Tactical Effectiveness Analysis

C. (U) DESCRIPTION: This project provides CNO and SECNAV direct analyses of Navy policy, strategy acquisition, and program planning in meeting the following objectives: (a) producing study results impacting upon important programs/issues, (b) identifying and evaluating policy and strategy alternatives and doctrine, and (c) evaluating the capabilities of programmed forces to accomplish missions assigned to the Navy. Deliverables consist of formal, structured documents containing or leading to conclusions and/or recommendations.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Continued studies on Navy program planning issues in force structures, fleet combat operations, readiness, sustainability, logistics support, C3, surveillance, intelligence, manpower, personnel, and training. Performed further research/assessments of ship, aircraft and base readiness resources to readiness measures and achievements.

b. (U) Continued research to evaluate the Navy's recruiting strategy and to develop an analysis of capabilities for input to JCS net assessment process.

c. (U) Addressed Navy program planning issues important to the development of Navy programs for FY 1994 and beyond.

d. (U) Conducted analyses to improve the effectiveness of current weapon systems, help decision makers to select realistic, more effective new systems and continue development of resources to readiness measurement.

2. (U) FY 1992 PROGRAM: Continue efforts to conduct studies and perform analysis evaluating concepts and strategies, defining requirements, assessing capabilities, reviewing program alternatives and analyzing program and planning issues.

3. (U) FY 1993 PLANS: Continue efforts to conduct studies and perform analysis evaluating concepts and strategies, defining requirements, assessing capabilities, reviewing program alternatives and analyzing programs and planning issues. These efforts include developing and maintaining readiness models and an econometric data base, and developing and maintaining a campaign analysis model to support JCS assessment analyses.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: CONTRACTORS: PRESEARCH, Inc., Arlington, VA; MATHTECH, Inc., Falls Church, VA; Synergy Inc., Washington, D.C.; PAI, Inc., Vienna, VA; HUMRO, Alexandria, VA.

F. (U) RELATED ACTIVITIES: PE 0605151M, Studies and Analysis Support, Marine Corps; PE 0605154N, Center for Naval Analyses, Navy.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605152N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Studies and Analysis Support, Navy
PROJECT NUMBER: R2040 PROJECT TITLE: Foreign Ship & Submarine
Vulnerability Program (SSVP)

C. (U) DESCRIPTION: This project assesses effectiveness of U.S. Navy weapons against potential foreign threat ships and submarines. It develops and upgrades analytical methods and models for evaluating weapon lethality against potential targets and for predicting threat ship/submarine vulnerability. It provides information needed for warhead design during acquisition processes, in-service weapon upgrades, weapon loadout requirements, and for tactical applications of weapons.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Completed target descriptions (TDs) for:
- b. (U) Completed terminal weapon effectiveness assessment (TWEA) for
- c. (U) Completed TD and TWEA for a
- d. (U) Updated ASW Warhead Effectiveness Compendium (ASWSEC).
- e. (U) Continued development of Submarine Vulnerability Evaluation Model (SUBVEM) and Ship Vulnerability Model (SVM).

2. (U) FY 1992 PROGRAM:

- a. (U) Initiate TDs for
- b. (U) Initiate TWEAs for
- c. (U) Continue updating of ASWSEC, SVM and SUBVEM.

3. (U) FY 1993 PLANS:

- a. (U) Initiate TDs for
- b. (U) Initiate TDs for
- c. (U) Initiate TWEAs for
- d. (U) Continue updating ASWSEC, SVM and SUBVEM.
- e. (U) Develop Ship Description and Vulnerability Data Base (SDV-DB).
- f. (U) Develop Component Vulnerable Area Table Data Base (CVAT-DB).

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVWPNCEN, China Lake, CA; NAVSWC, Dahlgren, VA; KAVSWC, White Oak, MD; and DTRC, Carderock, MD.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605152N **BUDGET ACTIVITY:** 6
PROGRAM ELEMENT TITLE: Studies and Analysis Support, Navy
PROJECT NUMBER: R2097 **PROJECT TITLE:** Manpower, Personnel, and Training Studies

C. (U) DESCRIPTION: The Chief of Naval Personnel has an ongoing need for direct analyses of Navy manpower, personnel, and training (MPT) policies and program planning. This project provides an essential management tool to: (a) assess the effectiveness of existing MPT programs, (b) identify needs for new programs, (c) determine required manpower and training mix relative to changing strategic and geopolitical factors, and (d) study the impact of MPT programs on Navy accession, retention, and performance. The program permits OPNAV to more effectively utilize MPT R&D expertise to respond to emerging MPT problems beyond Navy's control.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Not applicable.

2. (U) FY 1992 PROGRAM:

a. (U) Identify ways to enhance integration of women members into combat roles in sub/surface and air assignments.

b. (U) Assess the feasibility of artificial intelligence applications for achieving optimal member-assignment fit with decreased headquarters manpower.

c. (U) Assess Navy manpower projection models to determine ways to produce rapid, more accurate "What-if" projections in support of manpower reduction initiatives.

d. (U) Study and analyze emergent problems affecting MPT policy and programs.

3. (U) FY 1993 PLANS:

a. (U) Conduct studies of Navy MPT policies and procedures across a broad range of issues -- such as, reducing first-term attrition among top performers, examining job-related educational requirements, studying ways to reduce PCS moves.

b. (U) Examine emergent job market and educational preparation factors affecting accession/retention of top Navy performers.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NTSC Orlando, FL; NPRDC San Diego, CA; NAVPGSCOL Monterey, CA; USNA, Annapolis, MD; NOSC, San Diego, CA; NRL, Washington, DC.

F. (U) RELATED ACTIVITIES: Program Elements: P.E.# 0603707N, Manpower and Personnel Systems; P.E.# 0604703N, Personnel, Training, and Human Factors; 0602234N Systems Support Technology.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605152N

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE: Studies and Analysis Support, Navy

PROJECT NUMBER: W2092

PROJECT TITLE: Naval Aviation Studies

C. (U) DESCRIPTION: This project supports studies over a wide range of Naval aviation issues as a basis for the Assistant Chief of Naval Operations (Air Warfare) recommendations to the Chief of Naval Operations concerning major policy, planning, and acquisition program decisions. This effort is a management initiative which will allow accounting of study resources and allocate them in a timely manner according to priorities. This ongoing program will continue to leverage more detailed program specific analysis in order to gain insight into acquisition of various weapon systems and their impact on force structure, manning levels, operational readiness and carrier air wing effectiveness.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Completed parametric Advanced Air-to-Air Missile analysis.
- b. (U) Completed Desert Storm missile engagement opportunities study.
- c. (U) Completed first phase of radar cross section, speed and aircraft design impact study.
- d. (U) Completed F-18 and carrier defense study.
- e. (U) Initiated parametric Blue aircraft radar cross section versus surface-to-air missile study.
- f. (U) Completed first phase of single-seat versus two-seat study.

2. (U) FY 1992 PROGRAM:

- a. (U) Integrate Carrier Air Wing Study 2010 low observability lesson learned into AX Cost and Operational Effectiveness Analysis (COEA).
- b. (U) Complete parametric Blue aircraft radar cross section versus surface-to-air missile study.
- c. (U) Initiate study on impact of multiple aircraft life extension programs on carrier air wing capability.
- d. (U) Continue Air Wing Mix Analysis based on weapon and aircraft acquisition decisions in FY 1992.

3. (U) FY 1993 PLANS:

- a. (U) Initiate study to determine optimal replacement ratio for new aircraft, i.e., F-18 E/F for F-14, AX for A-6.
- b. (U) Initiate study to determine impact of weapons procurement decisions on Air Wing Mix.
- c. (U) Continue study on impact of multiple aircraft life extension program.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NADC, Warminster, PA; NWC, China Lake, CA; NATC, Patuxent, MD.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605154N

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE: Center for Naval Analyses, Navy

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C0031 *	MCOAG, CNA	4,477	4,157	4,521	Cont	Cont
RO148	Center for Naval Analyses, Navy	39,423	37,843	38,657	Cont	Cont
	TOTAL	43,900	42,000	43,178	Cont	Cont

* Project previously funded under PE 0605153M in FY 1992 and prior.
Consolidation reflects Congressional direction.

B. (U) DESCRIPTION: The Center for Naval Analyses (CNA) is the Department of the Navy's only Federally Funded Research and Development Center. CNA provides independent, objective, and expert analyses based on its unique access to sensitive data and the hands-on exposure to fleet operations gained through its world-wide field program. Because of rapid advances in technology, changes in the fleet, the increasing complexity of weapon systems, and the pressure to reduce budgets, the Navy has a greater need for analyses that are both sophisticated and timely. CNA is uniquely qualified to meet that need.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605154N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Center for Naval Analyses, Navy
PROJECT NUMBER: C0031 PROJECT TITLE: Marine Corps Operations Analysis

C. (U) DESCRIPTION: The CNA supports the Marine Corps Studies System (MCSS) by for conducting operations research, system analyses, and cost effectiveness studies in the areas of manpower utilization, equipment, tactics, weapon systems, operational tests, and field exercises.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: (Previously funded under P.E. 0605153M) Provided analytical support of the MCSS for more than twenty formal studies and analyses including: Desert Shield/Desert Storm Operations Lessons Learned, Cost and Operational Effectiveness Analyses (COEAs), Marine Air Combat Element Study, Marine Corps Portable Avionics Test Equipment, and Marine Corps Recruiting. Also conducted short-term analyses through the CNA Scientific Analyst Program and maintained CNA Field Representatives at six Marine Corps commands.

2. (U) FY 1992 PROGRAM: (Previously funded under P.E. 0605153M) Provide analytical support to the MCSS by conducting COEAs, evaluations of doctrine/organization/tactics, studies concerning manpower and force structure issues, and further analyses of Desert Shield/Desert Storm. Also continue Scientific Analyst and Field Representative support.

3. (U) FY 1993 PLANS: Continue the MCSS and other analyses and studies as required. In the transition to a new national security environment, CNA's analytical support will be needed to help Marine Corps address such issues as regional employment of USMC force packages, Marine Air-Ground Task Force (MAGTF) C3 requirements, MAGTF missions and manpower quality, and integration of USN/USMC force packages.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: None. CONTRACTOR: The Center for Naval Analyses, Alexandria, Virginia.

F. (U) RELATED ACTIVITIES: Program Element 0605151M, Studies and Analysis, Marine Corps.

G. (U) OTHER APPROPRIATION FUNDS: None.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: None.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605154N

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE: Center for Naval Analyses, Navy

PROJECT NUMBER: R0148 PROJECT TITLE: Center for Naval Analyses, Navy

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0148	Center for Naval Analyses, Navy	39,423	37,843	38,657	Cont	Cont

B. (U) DESCRIPTION: The Center conducts a wide range of projects that provide two fundamental services to the Navy: (1) on-site analyses for fleet commanders to improve tactics and readiness of existing forces, and (2) analyses for Navy headquarters decision-makers with responsibility for systems acquisition, program planning, and budgeting, and manpower management. CNA's capabilities cover a broad range of research areas, including: (a) System testing and fleet employment; (b) Warfare capability assessment; (c) Strategy, plans, and operations; (d) Readiness and sustainability; (e) Logistics; (f) Warfare modeling; (g) Manpower and training; (h) System evaluation and acquisition; (i) Resource management; (j) Technology assessment; (k) Methodology development; (l) Tactical development and evaluation; (m) Operational testing and evaluation; and (n) Cost and Operational Effectiveness Analyses (COEA) for acquisition milestones. This broad range of analysis is primarily financed in this program element for that effort which is fundamental to maintaining the basic CNA analytic capabilities. CNA also performs other studies and analysis to include Marine Corps operational analysis and fleet tactics evaluation which are financed elsewhere.

(U) CNA's analyses have resulted in substantial improvements in fleet effectiveness and significant cost avoidance.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: In addition to the research areas noted above, CNA continued efforts to address concerns of Congress and respond to legislation in areas such as net assessment, operational test and evaluation, and warfare area appraisals, master plans, and investment strategies, as well as specific acquisition issues to be addressed by COEAs. Some specific examples of research areas were:

a. (U) Developed and applied methodology in support of net assessments, that reflect independent, accurate and objective comparisons of forces. Also developed and maintained an accurate data base to support net assessment.

b. (U) Developed and applied methodology in support of master plans and investment strategies that allow clear rationale and justification for specific programs, budgets, schedules and quantities, and that provides basis for establishing funding priorities.

c. (U) Developed and refined criteria for use in selecting research and development programs, to ensure that these programs are affordable, technically feasible, appropriate to projected threats, and consistent with sound operational and tactical principles.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605154N

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE: Center for Naval Analyses, Navy

PROJECT NUMBER: R0148 PROJECT TITLE: Center for Naval Analyses, Navy

d. (U) Performed evaluations of new systems during operational testing, to ensure that scarce procurement funds are spent on programs that will perform as required.

e. (U) Developed and applied improved techniques for assessing the combat effectiveness of proposed weapon systems and for evaluating methods of improving fleet readiness and sustainability within budget constraints.

f. (U) Assessed methods of recruiting, training, and retraining Navy personnel in the face of a declining manpower pool and increased demands for skilled personnel in the private sector.

g. (U) Provided an independent objective forum through which the senior leadership of the USN/USMC can benefit from expert non-governmental advice on complex and contentious issues.

h. (U) Conducted COEAs on major acquisition programs.

i. (U) Developed Desert Shield/Desert Storm Operations Lessons Learned.

2. (U) FY 1992 PROGRAM: Address issues of major importance to the Navy's leadership in the research areas noted above. CNA's research program is planned in broad outline on an annual basis, and updated quarterly to identify specific studies to be conducted. The frequent review of CNA's program ensures that it is coordinated with other Navy research and that it addresses critical, high-priority issues requiring CNA's innovative and objective approach. In the recent budgetary climate the Navy must rely even more on CNA in its effort to maximize effectiveness from available resources.

3. (U) FY 1993 PLANS: CNA's research program will be updated quarterly to ensure CNA's research and studies support the Navy efficiently and effectively. CNA Research Staff Years will have been reduced to 201 from 225 in FY 1991. CNA's analytical support will be critical to Navy's transition to smaller budgets in a shifting national security environment. CNA's program will place greater emphasis on COEA's, tactical training, naval environmental issues, infrastructure, maritime contributions to joint operations, roles and missions of Navy, role of Naval Reserve, mine warfare, and efficiencies in readiness, logistics, and manpower.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: None. CONTRACTOR: The Center for Naval Analyses, Alexandria, Virginia.

E. (U) COMPARISON WITH FY 1992/1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: Not applicable.

3. (U) COST CHANGES: Increase in FY 1993 of \$12.0 million due to transfer of CNA efforts and associated funding from PEs 0605155N and 0605856N. Centralizes CNA core efforts and funding in this PE per Congressional direction.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605154N

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE: Center for Naval Analyses, Navy

PROJECT NUMBER: R0148 PROJECT TITLE: Center for Naval Analyses, Navy

- G. (U) RELATED ACTIVITIES: None.
- H. (U) OTHER APPROPRIATION FUNDS: This is a non-acquisition program.
- I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.
- J. (U) MILESTONE SCHEDULE: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605155N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Fleet Tactical Development and Evaluation
PROJECT NUMBER: R0151 PROJECT TITLE: Intertype TAC D&E

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0151	Intertype TAC D&E	7,518	3,982	7,797	Cont.	Cont.

B. (U) DESCRIPTION: This Program Element supports all naval warfare task areas and provides technical and analytical support to develop and evaluate tactics during Fleet operations and exercises. Results are new improved tactics for application in various mixes of force structures and weapon systems, including newly introduced systems, in various threat scenarios and directly add to warfighting effectiveness.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- (U) With analysis support provided by this program, Fleet commanders developed new tactics for Anti-Air Warfare, Anti-Submarine Warfare, Anti-Surface Warfare, Strike Warfare, Mine Warfare, and Amphibious Warfare.
- (U) Refined Tactical Decision Aids (TDA) and Fleet Mission Program Library (FMPL) software for desk-top and hand-held computers.
- (U) Developed/refined Navy Lessons Learned (NLL) system.

2. (U) FY 1992 PROGRAM:

- (U) Develop new advanced tactics including (but not limited to): S-3B Overland Strike Support, E-2C Self Defense, Counter mine warfare, and Anti-Air Warfare (AAW) in a multi-carrier battle group.
- (U) Develop NLLS to include Compact Disc-Read Only Memory (CD-ROM).
- (U) Refine TDAs and FMPL software for desk-top and hand-held computers.

3. (U) FY 1993 PLANS:

- (U) As determined by the TAC D&E Steering Committee, continue near-term efforts to correct tactical deficiencies identified through Fleet operations and exercises.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVTACSUPPACT, Silver Spring, MD; COMOPTEVFOR, Norfolk, VA. CONTRACTORS: DELEX, Inc., Tyson's Corner, VA; OMNI Analysis Inc., Norfolk, VA; Analysis and Technology, Stonington, CT; Summit Research Corp, Gaithersburg, MD.

E. (U) RELATED ACTIVITIES: Program Element 0603711N, Fleet Tactical Development and Evaluation.

F. (U) OTHER APPROPRIATION FUNDS: Not applicable.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605156M BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Marine Corps Operational Test and Evaluation
PROJECT NUMBER: C0033 PROJECT TITLE: Operational Test and Evaluation (OT&E) Support

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C0033	OT&E	1,099	2,898	1,803	CONT.	CONT.

B. (U) DESCRIPTION: This program supports Marine Corps Operational Test and Evaluation Activity (MCOTEA) representatives for Marine Corps OT&E and OT&E performed by Fleet Marine Force Commanders and Technical Support Activities. This program also provides for OT&E of systems prior to procurement by the Marine Corps to include test planning, operational testing, and independent evaluation report preparation.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Wrote test plans for STINGER Night Sight, Anti-Personnel Obstacle Breaching System (APOBS), and Advanced Tactical Air Command Central (ATACC).

b. (U) Conducted early operational assessment (EOA) of Advanced Amphibious Assault (AAA).

c. (U) Participated in multi-service test of Team Portable Communications Intelligence System and published an Independent Evaluation Review (IER).

2. (U) FY 1992 PROGRAM:

a. (U) Participate in the continuous planning and review of OT&E for numerous programs to include 16 major acquisition programs.

b. (U) Write test plans and conduct EOA of Unmanned Ground Vehicle, Tactical Soft Shelters and AAA.

c. (U) Write test plans and conduct OT&E of EXDRONE.

d. (U) Conduct Initial OT&E (IOT&E) of ATACC, APOBS, and STINGER Night Sight and publish IERs.

3. (U) FY 1993 PLANS:

a. (U) Publish IERs for EXDRONE and C-17.

b. (U) Complete Developmental Testing/Operational Testing of Light Armored Vehicle-Air Defense and publish an IER.

c. (U) Participate in multi-service testing of Joint Service Imagery Processing System and Advanced Anti-Tank Weapon System-Medium and publish IERs.

d. (U) Write test plans and conduct operational assessment of Global Positioning System Interface Unit and AN/TSC-96.

e. (U) Write test plans and conduct EOA of Thermal Imagers.

f. (U) Write test plans and conduct IOT&E of Position Locations Reporting System (PLRS) Communications Enhancement and PLRS Down Sized Master Station.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: MCOTEA and MARCORSYSOCH, Quantico, VA; NWC, China Lake, CA; APG, Dugway Proving Grounds, UT; MCTSSA, Camp Pendleton, CA. CONTRACTORS: NONE.

E. (U) RELATED ACTIVITIES: NONE.

F. (U) OTHER APPROPRIATION FUNDS: NONE.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605803N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: Electromagnetic Effects & Spectrum Control
PROJECT NUMBER: X0706 PROJECT TITLE: Electromagnetic Interference (EMI) and
Radio Frequency Control

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE CONT.	TOTAL PROGRAM CONT.
X0706	EMI & RF CONTROL	3,594	3,634	3,715		

B. (U) DESCRIPTION: This project develops advanced technology to identify and reduce EMI sources from Navy systems and platforms.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) 1991 ACCOMPLISHMENTS:

a. (U) Developed the Battle Force (BF) EMI Evaluation System (BEES) capability to eliminate the man-in-the-loop using decision trees in an Anti-Air Warfare (AAW) scenario to isolate the effects of EMI on operational tactics.

b. (U) Force Level Frequency Management Program (FLFMP) development included expanding the EM compatibility (EMC) Analysis Program to include more radars and platforms and BETA testing the Automated Spectrum Planning, Engineering, Coordination and Tracking System (ASPECTS).

c. (U) A Fiber Optic Working Group was organized to investigate promising fiber optics technology to improve Navy EMC.

d. (U) Conducted tests to determine the applicability of the Waveform Recording and Playback System (WRaPS) to replicate the BF EM environment (EME).

e. (U) Expanding BEES performance criteria and models to include system, platform and BF level effects of EMI on the force level EME.

2. (U) 1992 PROGRAM:

a. (U) Increase the BEES Library by completing the AAW scenario decision tree and including Anti-surface and Anti-submarine warfare (ASUW and ASW) areas.

b. (U) Complete initial capability for ASPECTS. Provide for fleet test.

c. (U) Evaluate promising fiber optic technology applications.

d. (U) Apply WRaPS to specific BF scenarios to verify its authenticity.

e. (U) Incorporate BEES criteria into the BEES Analyst Terminal (BAT) to facilitate EMI force level analysis.

f. (U) Study composite technology to determine its impact on EMC.

3. (U) FY 1993 PLANS:

a. (U) Increase the BEES Library. Complete the ASUW and ASW decision trees to provide the Navy a comprehensive management analysis tool that quantifies the impact of EM on force level combat effectiveness.

b. (U) Incorporate Navy user feedback into FLFMP development. This will ensure that ASPECTS meets specific fleet requirements for communications planning and frequency management.

c. (U) Evaluate promising fiber optics technology applications.

d. (U) Develop WRaPS to provide authentic signal match of BF EMI.

e. (U) Develop procedures and tools to evaluate and maximize EMC of systems/platforms developed using composite materials.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSWC, Dahlgren, VA and White Oak, MD; NAVOCEANSYSCEN, San Diego, CA; NRL, Wash, DC; and ECAC, Annapolis, MD.

E. (U) RELATED ACTIVITIES: Not Applicable.

F. (U) OTHER APPROPRIATION FUNDS: None.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605804N Budget Activity: 6
PROJECT ELEMENT TITLE: Technical Information Services
PROJECT NUMBER: R0835 PROJECT TITLE: Technical Information Services

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0835	Technical Information Services	3,124	11,483	14,619	Cont.	Cont.

(U) DESCRIPTION: This program encompasses the Navy's efforts to maintain orderly access to, and exchange of, technical information by the Navy and DoD and their present and potential contractors. The element provides Navy's share of support for the Defense Technical Information Center (DTIC) and Information Analysis Centers (IACs). The project supports transfer of Navy technology to business and local governments for civil use according to statutes, government policy, and executive order--Public Law 96-480, OMB Circular A-109, Federal Technology Transfer Act of 1986--through Navy Acquisition Research and Development Information Centers (NARDIC); Navy technology publications; domestic technology transfer; review of patents/inventions for potential licensing; Offices for Research and Technology Assistance (ORTA); promotion of cooperative R&D agreements.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- Implemented two-year Independent Research & Development (IR&D) reporting/review cycle.
- Increased on-site visits by 50%.
- Promoted technology transfer by authorizing 23 Cooperative Research & Development Agreements (CRDA); publicizing patents; issuing instructions.
- Administered delegation of CRDA authority to Navy laboratories.
- Completed pilot demonstration of Navy Work Unit database on CD-ROM.

2. (U) FY 1992 PROGRAM:

- Fund Navy share of DTIC-provided services and products and IAC services.
- Complete 2-year cycle for remaining IR&D companies.
- Conduct foreign company site visit.
- Promote linked databases for technology transfer with industry.
- Complete CD-ROM demonstrations.

3. (U) FY 1993 PLANS:

- Fund Navy share of DTIC and IACs usage.
- Promote timely, complete Navy scientific and technical information input to DTIC and utilization of capabilities of both DTIC and IACs by Navy inhouse activities and contractors.
- Initiate demonstration technology transfer marketing projects for analysis of potential return on investment and Navy-wide implementation.
- Set up technology transfer gateway systems in selected locations.
- Provide proportional funding of major laboratory Office of Research and Technology Assistance (ORTA) activities.
- Complete delegation of CRDA signature authority to major laboratory Commanding Officers.
- Produce and distribute IR&D project descriptions on CD-ROMs to Navy laboratories.
- Coordinate gathering and dissemination through NARDIC and DTIC of Navy planning information to companies for use in IR&D program formulation, in accordance with legislative requirements.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605804N

Budget Activity: 6

PROJECT ELEMENT TITLE: Technical Information Services

PROJECT NUMBER: R0835 PROJECT TITLE: Technical Information Services

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NOSC, San Diego, CA; DTRC, Bethesda, MD; NSWC, Dahlgren, VA; NUSC, New London, CT; and NWC, China Lake, CA; NADC, Warminster, PA. CONTRACTORS: Not Applicable.

E. (U) COMPARISON WITH FY 1992/93 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: None.

2. (U) SCHEDULE CHANGES: None.

3. (U) COSTS CHANGES: FY 1993 increase of \$11.3M is to cover DTIC and IAC products and services to be billed to Navy and pricing adjustments.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: Navy efforts are coordinated/conducted with Army and Air Force. Policy guidance from the Under Secretary of Defense (Acquisition.)

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605853N

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE: Management and Technical Support

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0231	ASW System Support					
		4,043	4,147	4,181	Cont	Cont
R0905	Naval Warfare Tactical Analysis					
		3,152	3,410	3,637	Cont	Cont
R1767	NWC Center for Naval Warfare Studies					
		1,366	1,435	1,504	Cont	Cont
X1795	C3CM Decision Aid System					
		*	2,591	3,425	Cont	Cont
TOTAL		8,561	11,583	12,747	Cont	Cont

* PE 0604270N/X1795 in FY-91

B. (U) BRIEF DESCRIPTION OF PROGRAM ELEMENT: This program provides analytical and management support to the Planning and Programming segments of the Planning, Programming and Budgeting System. The program element is comprised of four projects which affect the development of annual warfighting appraisals of each Warfare Task Area as well as support activities of the Center for Naval Warfare Studies at the Naval War College. Funding provides hardware and software, including future enhancements of both, in support of computer models which are necessary to collect performance data and measure system performance/effectiveness leading to rational cost/performance tradeoff recommendations and provides for the analyses that underpin the development of annual warfighting appraisals of each Naval Warfare Task Area including a summary warfare appraisal that integrates the individual warfare task.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605853N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Management and Technical Support
PROJECT NUMBER: R0231 PROJECT TITLE: ASW System Support

C. (U) DESCRIPTION: The project develops and reviews Navy's ASW Investment Strategy. Analyses are conducted to define ASW requirements, assess ASW programs and performance, and make cost/performance tradeoffs among ASW concepts. Efforts support definition of warfare requirements and development of ASW architectures.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Continued ASW model maintenance/modifications including major work on models applicable to shallow water and regional conflict. Work included sensors and weapons in the fleet and in development.

b. (U) Continued annual analysis in support of ASW Master Plan. Rapid evolution of third world threat and the President's new national strategy required intense analysis in how the Navy must re-focus efforts to areas other than the former Soviet Union. Substantial effort for shallow water annex to Master Plan using a seminar wargame on regional conflict.

c. (U) Completed ASW Task Appraisal. Extensive analysis in area of regional and global conflict was conducted to support appraisal. Reduced force structure predictions and realities coupled with new, and in some cases, more capable threats required additional driver sensitivities to be investigated.

d. (U) Commenced work on the third interim report of ASW Future Naval Force Requirements Study (Regional Conflict).

e. (U) Completed eight ASW System Performance studies including surface ship sonar, maritime patrol aircraft and periscope detection radar.

2. (U) FY 1992 PROGRAM:

a. (U) Continue to update ASW Master Plan by refining requirements for shallow water ASW and in potential areas of regional conflict.

b. (U) Complete third interim report of ASW Future Naval Force Requirements Study with emphasis on regional conflict.

c. (U) Complete modification of ASW weapons model to ensure proper analysis of weapon performance in shallow water.

3. (U) FY 1993 PLANS:

a. (U) Write the 1993 ASW MASTER PLAN and refine the ASW investment strategy.

b. (U) Conduct ASW System Performance analysis of ASW candidate programs.

c. (U) Continue ASW model maintenance/modifications.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NUSC, Newport, RI; NOSC, San Diego, CA. CONTRACTORS: CNA, Alexandria, VA; Systems Planning and Analysis, Arlington, VA; Presearch, Inc., Alexandria, VA; Mitre, McLean, VA; Institute for Defense Analysis, Alexandria, VA; Johns Hopkins/APL, Laurel, MD.

F. (U) RELATED ACTIVITIES: Supports all ASW Naval Warfare efforts.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605853N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Management and Technical Support
PROJECT NUMBER: R0905 PROJECT TITLE: Naval Warfare Tactical Analysis

C. (U) DESCRIPTION: The project provides analytical and management support to the DCNO (NAVAL WARFARE) as Warfare Task Sponsor for Anti-Submarine Warfare (ASW), Anti-Air Warfare (AAW), Strike Warfare (STK), Anti-Surface Warfare (ASUW), Space and Electronic Warfare (SEW), Amphibious Warfare (AMW), Mine Warfare (MIW), and Chemical and Special Warfare task areas. This project conducts continuing analyses of Navy's capabilities and limitations in execution of these missions. Master Plans are developed as blueprints for defining problems and requirements by warfare and functional areas for the next Defense Program. A Summary Warfare Appraisal integrates all individual Warfare Task Appraisals.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Continued support for Project OSPREY REINDEER; conducted warfare task appraisals in ASW, AMW, SEW; developed/updated Master Plans for MIW, AAW and SEW; and continued analytical efforts associated with functional areas. Continued to develop/incorporate cover and deception requirements for all warfare task areas.

2. (U) FY 1992 PROGRAM: Continue appraisals and support of OSPREY REINDEER. Continue major master plan updates at the rate of one to three warfare task areas per year. Initiate MIW data base, mine countermeasures effectiveness model and related analytical efforts.

3. (U) FY 1993 PLANS: Continue to fund appraisals, master plans and associated studies/analyses.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NCSC, Panama City, FL; NRL, Washington, D.C.; DTRC, Bethesda, MD; ; COMINELWARCOM, Charleston, SC; NWC, China Lake, CA. CONTRACTORS: Booz-Allen-Hamilton, Arlington, VA; The Aerospace Corporation, El Segundo, CA; Johns Hopkins/APL, Laurel, MD

F. (U) RELATED ACTIVITIES: Supports all Naval Warfare Areas

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605853N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Management and Technical Support
PROJECT NUMBER: R1767 PROJECT TITLE: Naval War College (NWC) Center
for Naval Warfare Studies (CNWS)

C. (U) DESCRIPTION: Analyze overall Naval strategy and provides recommendations to CNO and fleet commanders for improvements in both strategy and means by which agreed strategy is executed. This effort uniquely joins strategic and tactical concepts and tests the integrated concepts through wargaming. Objectives of the effort are to provide improvement in visibility of missions and roles of fleet forces and generate Naval strategy and campaign alternatives.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Provided support to CNO Strategic Studies Group (SSG) at planned levels and support to CNWS. Provided campaign option support in response to CNO and fleet tasking, addressing the employment of Naval forces not only in the context of Global War, but also in regional crises and contingencies. Addressed the impact on force structure and strategy of Global economic strategic trend and arms agreements. Established coordination between strategy and technology through integration of emerging technologies into war game application and research. Continued multilateral programs. Continued intelligence support to maritime campaigns.

2. (U) FY 1992 PROGRAM: Provide support to SSG at planned levels. In addition to continued campaign option support in global conflict, multinational cooperation in dealing with regional conflict and contingencies, the use of military in drug intervention will be assessed. Commence the fourth Global War Game of the third five year series. Continue development of coordination between strategy and technology through integration of emerging technologies into war game/research. Continue multilateral program. Continue intelligence support to maritime campaigns.

3. (U) FY 1993 PLANS: Provide support to SSG and CNWS at planned levels. Continue campaign option support in global conflict, regional conflict and contingencies. Commence the fifth global war game of the third five year series. Continue development of coordination between strategy and technology through integration of emerging technologies into war game/research. Continue multilateral program and intelligence support to maritime campaigns.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: Naval War College (NWC), Newport, RI;
CONTRACTORS: Sonalysts, Inc., Waterford, CT.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605853N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Management and Technical Support
PROJECT NUMBER: X1795 PROJECT TITLE: Command, Control, and
Communications Countermeasures
(C3CM) Decision Aid System

C. (U) DESCRIPTION: The Countermeasures Assessment System (CMAS) is a unique, large scale, high resolution, real time, all source C3CM simulation and analysis system that simulates, in fine detail, analytical cases ranging from one-on-one situations to global campaigns. CMAS provides an interactive operational analysis to assess effectiveness of systems under development, perform architecture assessments, and support tactics development and evaluations which are not amenable to wargaming or fleet exercises due to complexity, expense or security considerations. Its products are used in the Space and Electronic Warfare (SEW) appraisal and program planning process.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Project X1795 was funded in P.E. 0604270N in FY-91.

2. (U) FY 1992 PROGRAM:

- a. (U) Continue coding and documentation as necessary.
- b. (U) Assess effectiveness of SEW systems when employed in the FY 1992 Defense Planning Guidance scenarios for Major Regional Conflict (MRC) with Iraq (MRC-EAST) and North Korea (MRC-WEST). Use results to provide analytical support to the program planning process and SEW appraisal process.

3. (U) FY 1993 PLANS:

- a. (U) Assess effectiveness of SEW systems when employed in the scenarios provided in the FY 1993 Defense Planning Guidance. Use results to provide analytical support to the program planning process and SEW appraisal process.
- b. (U) Support operational assessment of Navy Tactical Command System - Afloat (NTCS-A).
- c. (U) Purchase hardware components for Phase 1 of a 3-phase CMAS computer upgrade to achieve the high computing speeds and advance graphic display features needed for accurate assessments of sophisticated future own-force and threat-force SEW systems.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NOSC, San Diego, CA CONTRACTORS: None

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605856N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: Strategic Technical Support

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
M0100	Biomedical Support for Submarine Systems	1,225	1,237	1,412	Cont.	Cont.
R0128	Management and Technical Support, Strategic	1,963	2,085	2,093	Cont.	Cont.
Z1038	Acoustic and Non-Acoustic Analysis Support	1,205	1,332	1,381	Cont.	Cont.
	TOTAL	4,393	4,654	4,886		

B. (U) DESCRIPTION:

1. (U) M0100 Biomedical Support for Submarine Systems - Provides biomedical knowledge necessary to increase effectiveness and enhance performance of critical submarine tasks with particular emphasis on development and assessment of improved visual and auditory sonar techniques to improve the operator's ability to detect, track and classify multiple targets. Additionally, man-machine interface and submarine habitability issues are investigated.

2. (U) R0128 Management and Technical Support, Strategic - Develops strategic and theater nuclear concepts, determines technology requirements, defines systems and options, evaluates system mixes, evaluates and establishes requirements for strategic force survivability against anti-submarine and anti-ballistic missile threats, conducts Sea Launched Ballistic Missile (SLBM)/Sea Launched Cruise Missile (SLCM) targeting application and deployment studies, examines reentry system requirements in support of sea-based strategic and theater nuclear systems, and establishes Navy Strategic Command, Control and Communications requirements. It includes assessment of future strategic and technology environments, the implications of that environment on national security policy, grand national strategy, maritime strategy, and consequential force requirements and employment policies for strategic forces. Develop policy recommendations concerning arms control and its affect on Naval forces, both nuclear and conventional. This project provides unique support necessary to produce optimum future naval contributions to strategic and theater nuclear forces.

3. (U) Z1038 Acoustic and Non-Acoustic Analysis Support - Provides analysis of acoustic and non-acoustic data for ASW systems. Analyses are provided by Naval Maritime Intelligence Center (NAVMIC) to exploit specific submarine characteristics by revised tactics or new ASW systems.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605856N **BUDGET ACTIVITY:** 3
PROGRAM ELEMENT TITLE: Strategic Technical Support
PROJECT NUMBER: R0128 **PROJECT TITLE:** Management and Tech Support,
Strategic

C. (U) PROJECT DESCRIPTION: Analytical support to CNO, SECNAV, JCS, and OSD in evaluation of strategic and theater nuclear issues within Navy program and overall balance within strategic forces. Evaluation of force capabilities and requirements, analysis of systems under development, trade-off analysis, and future national policy and strategy.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) **FY 1991 ACCOMPLISHMENTS:** Continued trade-off analyses of system mixes and reduction in forces due to arms limitations negotiations. Continued trade-off analysis relating to weapons warhead mix. Conducted analysis of Single Integrated Operational Plan (SIOP) 6H. Studied optimization of special nuclear resources. Continued SSBN security studies. Developed program to determine cost effective force mix. Assessed Intercontinental Ballistic Missile (ICBM) and SLBM survivability. Performed targeting research including footprint formulation. Strategic Policy Analysis Group (SPAG) to provide broad-based examinations of strategic issues on a continuing basis. Continued work on STRATPLAN 2010, a long range planning process designed to assist Navy decision makers on strategic issues.

2. (U) **FY 1992 PROGRAM:** Continue to assess trade-offs relating to weapon configuration, targeting policy, ASW threat and operational requirements for current and future sea-based strategic and strategic related nuclear forces and C3I assets complete a SIOP-94 replanning study to determine if there are any changes required to SIOP structure. Study Fleet Ballistic Missile (FBM) sufficiency. Develop a model to simulate the modern ASW threat to our FBM forces. Develop policy recommendations concerning arms control and its effect on Naval forces, both nuclear and conventional. Complete evaluation of sea-based strategic and strategic related nuclear forces to meet the needs of future national policy under STRATPLAN 2010.

3. (U) **FY 1993 PLANS:** Continue to assess trade-offs to weapon configuration, targeting policy, ASW threat and operational requirements for current and future sea-based strategic, strategic related nuclear forces and C3I assets, and arms control matters.

4. (U) **PROGRAM TO COMPLETION:** This is a continuing program.

E. (U) WORK PERFORMED BY: In-house: NSWC, Dahlgren, VA; Contractors: Academy for Interscience Methodology, Hinsdale, ILL; Mitre Corporation, Mclean, VA; Johns Hopkins University/Applied Physics Laboratory, Laurel, MD.

F. (U) RELATED ACTIVITIES: PE 0603311F, Advanced Strategic Missile Systems (technology exchange); PE 0101221N, Fleet Ballistic Missile System; PE 0101228N, Trident; PE 0604363N, Trident II; PE 0605864F, Test and Evaluation Support.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605856N BUDGET ACTIVITY: 3
PROGRAM ELEMENT TITLE: Strategic Technical Support

PROJECT NUMBER: M0100 PROJECT TITLE: Biomedical Support
Submarine Systems

C. (U) DESCRIPTION: This project increases effectiveness and enhances performance of critical submarine tasks. The project upgrades target acquisition, identification, and tracking capabilities to maximize effectiveness of defensive and offensive systems. Also, man-machine interface in auditory and visual systems will be evaluated concentrating on improved accuracy, speed, and efficiency to detect, classify and identify multiple targets. Emphasis is on assessing and developing new visual and auditory techniques that improve operator skills.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Determined output limiting parameters that least degrade operator performance.
- b. (U) Determined optimal temporally and spectrally based signal processing techniques for improved detection, classification and tracking, waterfall display performance effects of 1, 2, and 3 bit quantization of background noise, and effect of color names on cognitive sonar task performance.
- c. (U) Evaluated new sonar headsets. Reported filter bandwidth effects on binaural enhancement. Reported at-sea test results of binaural display technique.

2. (U) FY 1992 PROGRAM:

- a. (U) Develop the Authorized Medical Allowance List (AMAL) for submarines to provide contingency treatment of serious non-crew member casualties.
- b. (U) Report effectiveness of temporally based signal processing, effectiveness of detection using binaural separation and analysis of edge-detection algorithms for detection targets in certain displays.
- c. (U) Develop appropriate noise level criteria for submarine berthing spaces to permit recovery from noise induced auditory threshold shifts incurred while on duty and prevent degraded performance of aural tasks.

3. (U) FY 1993 PLANS:

- a. (U) Determine effect of color coded Cathode Ray Tube (CRT) displays in the control room on the night vision of the periscope operator.
- b. (U) Compare actual detection/recognition performance with ideal performance for 1,2, and 3 bit quantization.
- c. (U) Determine effects of signal compression/expansion on detection and discrimination.
- d. (U) Evaluate feasibility of digital restructuring for signal enhancement.
- e. (U) Measure effects of temporal reversal and peak enhancement.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVSUBMEDRSCHLAB, New London, CT.
CONTRACTOR: None.

F. (U) RELATED ACTIVITIES: None.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605856N **BUDGET ACTIVITY:** 3
PROGRAM ELEMENT TITLE: Strategic Technical Support
PROJECT NUMBER: Z1038 **PROJECT TITLE:** Acoustic and Non-Acoustic
Analysis Support

C. (U) DESCRIPTION: Provides for research and development of new data collection and analysis techniques in support of sensor and weapons system development; supports development of effective ASW tactics and identification of target characteristics and vulnerabilities through technical analysis of operational scenarios; provides unique hardware and software development at the Naval Maritime Intelligence Center (NAVMIC).

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) **FY 1991 ACCOMPLISHMENTS:** Continued nontraditional characterization. Completed Phase I development of the processing system, which will support the first deployment of BSY-1 (digital) equipped submarine development of the Enhanced Multi-Segment Track (EMST) tool (readies EMST for use on the system); assessments of auxiliary machinery systems on Type 209 diesels and threat submersibles; new propagation model for use in measurement.
2. (U) **FY 1992 PROGRAM:** Continue on-going projects; development of the system; development of signal processing techniques with a major emphasis on hardware and software that supports analysis of systems; development of modeling efforts and analysis techniques to quantify system performance and predict Commence integration of High Density Digital Recorders (HDDR) at NAVMIC.
3. (U) **FY 1993 PLANS:** Continue on-going projects. Complete development of the integration of hardware and software for.
4. (U) **PROGRAM TO COMPLETION:** This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVMIC; Suitland, MD., DTNSRDC; Carderock, MD., NAVOCEANSYSCEN; San Diego, CA., NUWC; New London CT.
CONTRACTORS: Applied Physics Laboratory/University of Washington, Planning Systems Inc; Sunnyvale, CA.,

F. (U) RELATED ACTIVITIES: PE 0604784N - Fixed Distributed System (FDS); PE 0204311N - Integrated Undersea Surveillance System; PE 0204313N - Surveillance Towed Array Sensor System.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Agreements for the exchange of undersea acoustic surveillance data exist between the U.S. and Japan/Canada.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605857N

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE: International RDT&E

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	Total Program
R0115	Supreme Allied Commander Atlantic, Undersea Research Centre (SACLANTCEN)	1,116	297	336	Cont.	Cont.
R0149	International Cooperative RDT&E	1,760	964	1,091	Cont.	Cont.
	TOTAL	2,876	1,261	1,427	Cont.	Cont.

B. (U) DESCRIPTION: Provides program management, execution, and support to implement a broad range of cooperative naval R&D initiatives with allied and friendly nations. Program reviews potential cooperative efforts to determine the:

- (U) fulfillment of established operational requirements
- (U) enhancement of U.S./allied interoperability and standardization
- (U) acquisition of foreign technologies
- (U) reduction of U.S. developmental and recurring costs.

Selected cooperative programs are fully coordinated with U.S. national programs to ensure mutually supportive action. Such efforts result in the following activities annually:

- (U) development and negotiation of approximately 25 international RDT&E Memoranda of Understanding (MOUs) with allied and friendly nations;
- (U) management of over 350 information exchange agreements;
- (U) management of DoN's Scientist/Engineer Exchange Program involving approximately 40 U.S. and allied personnel; and
- (U) participation in DoD directed armaments cooperation fora such as Conference of NATO Armaments Directors (CNAD) groups (including the NATO Naval Armaments Group), Senior National Representative (SNR) consultation, and The Technical Cooperation Program (TTCP).

This program element also provides for the salaries and administrative cost to maintain the U.S. scientific staff assigned to the Supreme Allied Commander Atlantic, Undersea Research Centre (SACLANTCEN), La Spezia, Italy. Additionally, it supports collaboration between U.S./SACLANTCEN scientists, the lease/loan of equipment, and the purchase of expendables to support the Centre's scientific program.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605857N

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE: International RDT&E

PROJECT NUMBER: R0115

PROJECT TITLE: Supreme Allied Commander
Atlantic Undersea Research
Centre (SACLANTCEN)

C. (U) DESCRIPTION: This project provides for salary and administrative costs for U.S. Navy scientists at NATO Supreme Allied Commander Atlantic Undersea Research Centre (SACLANTCEN), La Spezia, Italy. It also provides for all U.S. direct support to SACLANTCEN for administering requests for equipment, other assets, services and to foster collaboration between U.S. and SACLANTCEN scientists. The Centre's unique research facilities and reservoir of oceanographic/acoustic data bases and knowledge are used to augment and complement USN ASW-related research.

D. (U) PROJECT ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Supported scientific collaboration in area of ocean acoustics, ocean/acoustics numerical modeling and seafloor studies. Provided measurement equipment/expendables and lab equipment. Supported joint U.S./SACLANTCEN reverberation measurement program, ocean/acoustic model validation program in the Greenland-Iceland-Norwegian Seas, and co-sponsored shear wave workshop held at SACLANTCEN.

2. (U) FY 1992 PROGRAM: Continuation of support of collaboration between the U.S. and SACLANTCEN scientist and continue the joint U.S./SACLANTCEN Reverberation program.

3. (U) FY 1993 PLANS: Continuation of the collaboration between the U.S. and SACLANTCEN scientist. Increase efforts in the area of shallow water and mine warfare and commence validation of ocean/acoustic models in a strategically significant ocean area.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NOARL, Stennis Space Center, MS.; NUSC, New London, CT; OCNR, Arlington, VA; SACLANTCEN, La Spezia, Italy; NOSC, San Diego, CA. CONTRACTORS: Woods Hole Oceanographic Institution, Woods Hole, MA.

F. (U) RELATED ACTIVITIES: PE 0601153N - Defense Research Science; PE 0602435N - Ocean and Atmospheric Support Tech; PE 0603207N - Air/Ocean Tactical Applications; PE 0603704N - ASW Oceanography; PE 0603785N - ASW Environmental Acoustic Support.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NATO SACLANT ASW Research Centre Charter 31 Oct 1962.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605857N

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE: International RDT&E

PROJECT NUMBER: R0149

PROJECT TITLE: International
Cooperative RDT&E

C. (U) PROJECT DESCRIPTION: International RDT&E project efforts include: development/negotiation of R&D international MOUs required to implement cooperative R&D projects; management of information exchange programs, Scientist/Engineering Exchange Program (SEEP) efforts including language training for U.S. participants; and participation in DoD directed armaments cooperation fora such as Conference of NATO Armaments Directors (CNAD) groups and The Technical Cooperation Program (TTCP).

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Developed and negotiated 25 R&D cooperative project MOUs with allied and friendly nations. Concluded 10 MOUs including two with Canada, one for development of Mass Memory Unit and another for development of Mini-Drifting Data Buoy, one with Norway for codevelopment of Magnetic Array Sensor System, and one with Spain, France, Germany, and Italy for full scale development of Multifunctional Information Distribution System. Developed and implemented an automated DoN MOU Tracking and Reporting System as well as a MOU Generator System to assist in drafting new RDT&E MOUs. Conducted joint reviews with France, Germany, Sweden, and Norway of 103 existing information exchange agreements with these countries. Concluded two Data Exchange Agreement (DEA) annexes one with Germany for Advanced Magnetic Technologies and one with Canada for Radar Electronics Intelligence Support Systems (USMC cog).

2. (U) FY 1992 PROGRAM: Target R&D cooperative project MOU effort to focus on "high leverage" DoN R&D programs. Continue the systematic review of the remaining 250 information exchange agreements and make revisions to DEAs as indicated from FY-90 and 91 reviews. Target new technologies and countries for information exchange. Develop an automated DEA/IEP Tracking and Reporting System.

3. (U) FY 1993 PLANS: Develop and negotiate "high leverage" R&D cooperative project MOU's. Development of a DOD MOU Generator for use by the Army, Air Force and Marine Corps to standardize MOU language throughout the services. Enhance linkage between domestic DoN technology objectives and DoN international RDT&E efforts. Increased effort reflects need to complete initiations/revisions/terminations to bulk of DEAs reviewed in FY-92.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVORDSTA, Indian Head, MD; DTRC, Bethesda, MD; CONTRACTORS: Crosspaths, Arlington, VA; Booz Allen, Arlington, VA

F. (U) RELATED ACTIVITIES: OSD provides project funding on the following: PE 0605130D, Foreign Cooperative Testing; and PE 0603790D, Nunn Armaments Cooperation.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Effort includes development/negotiation of all DoN R&D international MOUs required to implement cooperative R&D projects. Funding is not project specific.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605861N

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE: RDT&E,N Science and Technology Management

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0135	OCNR Science and Technology Management	46,064	48,808	51,942	Cont.	Cont.
R1855	Science/Engineering Training Support	527	528	647	Cont.	Cont.
M0104	NAVMED Management Support	6,608	6,699	*	*	*
X0832	Central Management Support	1,370	1,372	1,768	Cont.	Cont.
	TOTAL	54,569	57,407	54,357	Cont.	Cont.

* This project transfers to 0605861D in FY 1993 as a continuing program.

B. (U) DESCRIPTION: This program supports the Office of the Chief of Naval Research (OCNR) and small non-overhead distributing Navy R&D activities. It pays salaries, rent, utilities, printing, supplies, materials, and other day-to-day costs that are necessary to support these Navy activities that administer and execute the Navy's R&D program. The vast majority of these costs are fixed costs which primarily support scientists and engineers working on the Navy Science and Technology Program. For overhead distributing activities, this program covers costs not chargeable to overhead or to customers such as base closure and severance pay costs.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605861N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E, N Science and Technology Management
PROJECT NUMBER: R0135 PROJECT TITLE: OCNR Science and Technology Mgmt

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0135	OCNR Science and Technology Management	46,064	48,808	51,942	Cont.	Cont.

B. (U) DESCRIPTION: This project supports the Navy's entire Science and Technology mission. OCNR sponsors scientific advances which benefit all Navy mission areas, including anti-submarine warfare and anti-air warfare, and supports the fleet's ability to operate from a position of technological superiority. OCNR provides management and direction for the entire Navy Science and Technology program. Functions performed include: (1) Scientific and technical direction of the nationwide Category 6.1 basic research program with colleges, universities, and Navy laboratories; (2) scientific and technical direction of the 6.2 exploratory development program through the Navy's R&D laboratories and centers; (3) management and formulation of the Navy Advanced Technology Demonstration program (Category 6.3A); (4) management, resource formulation, program assessment and contract negotiation/administration of the entire Navy basic research and exploratory development program; (5) program management and administrative support to selected research programs of SDIO, DARPA, CNO, and SBIR; (6) coordination of the Navy's Tech Base program within the context of total DoD/Government (i.e., National Science Foundation, National Academy of Sciences) R&D initiatives in order to obtain maximum scientific advances. This project funds salaries, rent, utilities, supplies and other fixed costs at OCNR Headquarters and field offices.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS

1. (U) FY 1991 ACCOMPLISHMENTS: The project provided support for the OCNR headquarters, the ONR European Office (London), the ONR Asian Office (Tokyo), and field detachments. Beginning in FY-91, this program funded management and formulation of the Navy Advanced Technology Demonstration program (Category 6.3A) and contract negotiation/administration support for the Tri-Service Independent Research and Development and Bid and Proposal programs.

2. (U) FY 1992 PROGRAM: The project will continue to provide for basic costs of the OCNR headquarters and its field activities in support of the entire Navy Science and Technology program. Specifically, it pays salaries of scientific and engineering personnel who direct the execution of the Navy's basic research (Category 6.1), exploratory development (Category 6.2) and Advanced Technology Demonstration (Category 6.3A) programs at the nation's

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605861N

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE:

RDT&E,N Science and Technology Management

PROJECT NUMBER: R0135

PROJECT TITLE: OCNR Science and Technology Mgmt

universities/colleges and Navy laboratories. In addition to its Navy Science and Technology mission, OCNR provides important program management and administrative support to SDIO, DARPA, and CNO. Almost all the funds in this project are fixed costs, such as salaries, building rent, communications, etc.

3. (U) FY 1993 PLANS: The project will continue to provide for basic costs of the OCNR headquarters and its field activities in support of the entire Navy Science and Technology program. Specifically, it will pay the salaries of scientific and engineering personnel who direct the execution of the Navy's basic research (Category 6.1), exploratory development (Category 6.2) and Advanced Technology Demonstration (Category 6.3A) programs at the nation's universities/colleges and Navy laboratories. In addition to its Navy Science and Technology mission, OCNR will provide important program management and administrative support to SDIO, DARPA, and CNO. Almost all the funds in this project will be fixed costs, such as salaries, building rent, communications, etc. The increase from FY-92 to FY-93 is due to inflation, full-year annualization of pay raises, and functional transfer of civilian personnel office (19 billets) from Chief, Naval Oceanography Command. The project will continue to provide support for the OCNR headquarters, the ONR European Office (London), the ONR Asian Office (Tokyo), and field detachments.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: OCNR, Arlington, VA; ONREUR, London, England; ONRASIA, Tokyo, Japan; ONRDET Boston, MA; and ONRDET Bay St. Louis, MS. CONTRACTORS: Not applicable.

E. (U) COMPARISON WITH FY 1992/93 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: Not applicable.

3. (U) COST CHANGES: Decrease of \$4.4M in FY 93 due to readjustment of inflation factor, realignment of contract management functions, and realignment of funding to meet Naval priorities.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: Program Element 0605862N, RDT&E Instrumentation Modernization, which funds investment items for the activities covered in this program element.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605861N	BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE:	RDT&E,N Science and Technology Management
PROJECT NUMBER: R0135	PROJECT TITLE: OCNR Science and Technology Mgmt

- H. (U) OTHER APPROPRIATION FUNDS: Not applicable.
- I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.
- J. (U) MILESTONE SCHEDULE: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605861N

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE:

RDT&E,N Science and Technology Management

PROJECT NUMBER: R1855

PROJECT TITLE: Science/Engineering Training Spt

C. (U) DESCRIPTION: Project consists of long term professional education and training for Navy civilian scientists and engineers to maintain and update essential skills and develop new expertise as needed.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Provided long-term professional training and education to 50 persons.

2. (U) FY 1992 PROGRAM: Provide long-term professional training and education for more than 50 persons with increased fiscal support provided per person.

3. (U) FY 1993 PLANS: Provide long-term professional training and education for more than 70 persons.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: Not applicable.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS. Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605861N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E,N Science and Technology Management
PROJECT NUMBER: M0104 PROJECT TITLE: Naval Medical Management Support

C. (U) DESCRIPTION: This program funds certain program-wide management and operational costs at the Naval Medical Research and Development Command and specified Naval Medical Laboratories that do not distribute overhead. Funds are used for general administrative expenses including salaries of support personnel, centralized technical services, common support costs under host-tenant agreements, routine maintenance and repair of buildings, and costs of laboratory support provided by other agencies/commands.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

A. (U) Provided management support for operations at Naval Medical Research and Development Command Headquarters, three in-house laboratories and two detachments.

B. (U) Provided increased support for further development of the Naval Medical Research Institute Detachment in Lima, Peru.

2. (U) FY 1992 PROGRAM: Continue to provide support as described above for those activities identified in paragraph E below.

3. (U) FY 1993 PLANS: Funds transferred to P.E. 0605861D where it will continue to provide support for activities identified in paragraph E below.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: Naval Medical Research and Development Command Headquarters, Bethesda, MD; Naval Dental Research Institute, Great Lakes, IL; U.S. Naval Medical Research Unit No. 2, Jakarta, Indonesia; U.S. Naval Medical Research Unit No. 2 Detachment, Manila, RP; U.S. Naval Medical Research Unit No. 3, Cairo, Egypt; Naval Medical Research Institute Detachment, Peru.

F. (U) RELATED ACTIVITIES: Program Element 0605862N, RDT&E Instrumentation Modernization, funds investment items and general purpose equipment for activities in this program element.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605861N

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE:

RDT&E,N Science and Technology Management

PROJECT NUMBER: X0832

PROJECT TITLE: Central Management Support

C. (U) DESCRIPTION: This project supports centrally managed interlaboratory projects at the Navy R&D Centers such as the Navy Laboratory Computer Committee, the Engineering Software Support Group, R&D Center Strategic Planning, the Navy Laboratory Video Teleconferencing Study Group, and other emerging RDT&E issues which cut across Navy Warfare Centers. Funds will be used for directed mission purification studies, Warfare Center Systems Concept studies, implementation of a Warfare Center RDT&E history program, preparation and review of the Warfare Center management briefs, and studies of software development and integration processes across multiplatform architectures.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Provided support to the centrally managed interlaboratory projects and for residual costs.
2. (U) FY 1992 PROGRAM: Continue to provide support to the centrally managed interlaboratory projects and for residual costs.
3. (U) FY 1993 PLANS: Continue to provide support to the centrally managed interlaboratory projects and for residual costs.
4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: DTRCEN, Bethesda, MD; NAVSWC, Dahlgren, VA; NAVWPNCEN, China Lake, CA; NUSC, Newport, RI; NAVAIRDEVCEN, Warminster, PA; NAVCOASTSYSCEN, Panama City, FL; and NAVOCEANSYSCEN, San Diego, CA.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605862N BUDGET ACTIVITY: 6
 PROGRAM ELEMENT TITLE: RDT&E,N Instrumentation Modernization

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0137	OCNR Science & Technology Instrumentation Modernization	2,914	4,610	4,909	Cont.	Cont.
M0105	NAVMED Instrumentation and Material Support	4,862	1,852	0*	Cont.	Cont.
S0353	NAVSEA Instrumentation and Material Support	1,434	1,180	1,387	Cont.	Cont.
W0566	NAVAIR Instrumentation and Material Support	2,649	2,087	2,764	Cont.	Cont.
X0799	SPAWAR Material Support	250	250	335	Cont.	Cont.
X0833	Instrumentation and Material Support	1,070	338	371	Cont.	Cont.
S1957	Large Cavitation Channel	5,858	4,621**	5,734	Cont.	Cont.
	TOTAL	19,037	14,938	15,500	Cont.	Cont.

* Transferred to 0605862D in FY 1993.

B. (U) DESCRIPTION: This program element funds investment costs at certain Navy research, development, test and evaluation laboratories and facilities. These laboratories and other facilities are involved in diverse activities such as, oceanographic and atmospheric research and development, medical R&D including research of new methods of combat casualty care, energy conservation, weapons testing, personnel related research and development, the Navy's space program, and a number of other programs. This program provides for research equipment in support of multiple program requirements at the Naval Research Laboratory, Stennis Space Center (NRL-SSC formerly NOARL).

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605862N

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE: RDT&E,N Instrumentation Modernization

PROJECT NUMBER: R0137 PROJECT TITLE: OCNR Science & Technology

Instrumentation Modernization

C. (U) DESCRIPTION: Project provides for acquisition of essential general purpose research equipment and its installation at Naval Research Laboratory, Stennis Space Center (NRL-SSC formerly NOARL) for oceanographic, acoustic, and atmospheric R&D development programs. Oceanographic, ocean acoustic, arctic, and mapping, charting and geodesy equipment is deployed over-the-side, on the bottom, and on the ice in hostile conditions. New Navy and DOD program requirements, advances in launched satellites, and advanced communication technologies require new equipment acquisition and upgrades to support new technical thrusts. This project also purchases ADP equipment related to OCNR Hdqtrs; support equipment for OCNR Hdqtrs and its field offices/detachments; and general purpose research equipment at Naval Personnel Research and Development Center (NPRDC).

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Purchased specialized acoustic processing equipment and underwater measurement devices to support different technology based experimental programs; e.g, the expansion of deep sea current observation capabilities which can determine variability of large water masses at depth. Purchased a parametric source that will contribute to the resolution of small scale subbottom heterogeneities within marine sediments. Purchased a major processing upgrade to accommodate new advanced remote sensing capabilities which include multi-altimeters and new ocean application of sea surface heights. Purchased other new equipment and upgrades to provide for ocean and atmospheric data assimilation and graphic visualization devices.

b. (U) Supported equipment for OCNR Hdqtrs, field offices/detachments.

2. (U) FY 1992 PROGRAM:

a. (U) Purchase research equipment to support acoustics, oceanographic and atmospheric programs including at sea acoustic measurement equipment, lab research equipment, and data processing systems. A major equipment purchase will be an in-site sediment acoustics system which will measure compressional and shear wave velocity attenuation in surficial sediments.

b. (U) Support equipment for OCNR Hdqtrs, field offices/detachments.

3. (U) FY 1993 PLANS:

a. (U) Continue acquisition of general purpose research equipment to support acoustics, oceanographic, and atmospheric programs. Equipment will include at-sea acoustic measurement equipment, data processing systems, and lab research equipment. Some of the major purchases will be Towed Array Signal Processing System, a Multiplexed Hydrophone Array, a Computer System Expansion for satellite research, a Multispectral Image Processing System, and the completion of the Low Frequency Sidescan System.

b. (U) Support equipment for OCNR Hdqtrs, field offices/detachments.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NRL-SSC, (formerly NOARL) Stennis Space Center, MS; NPRDC, San Diego, CA; OCNR, Arlington, VA CONTRACTORS: TBD

F. (U) RELATED ACTIVITIES: Program Element 0605861N (RDT&E,N Science & Technology Mgmt) and Navy R&D S&T programs in oceanography, acoustics, and atmospheric science being performed at NRL-SSC.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS. Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605862N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E,N Instrumentation Modernization
PROJECT NUMBER: 80353 PROJECT TITLE: NAVSEA Instrumentation and
Material Support

C. (U) DESCRIPTION: Funding in this project is used for procurement of needed safety and station equipment; first destination transportation; and the hulk program providing storage, basic configuration and maintenance of RDT&E target ships.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Procured engineering support equipment.
- b. (U) Upgraded production for hardware EOD publication.
- c. (U) Procured bow rigging to replenish pool assets.
- d. (U) Coordinated assets for pool outyear utilization.
- e. (U) Transited Ex-Somers from Pearl Harbor to PMTC.
- f. (U) Commenced conversion of Ex-John Paul Jones.

2. (U) FY 1992 PROGRAM: Procure needed safety and station equipment and first destination transportation; provide technical, maintenance and management services for target hulk pool; identify and obtain target ship for conversion in FY 1993. Complete conversion of Ex-John Paul Jones.

3. (U) FY 1993 PLANS: Procure needed safety and station equipment and first destination transportation; provide technical, engineering and management services for the target hulk pool. Initiate conversion of target ship obtained in FY 92.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: PACMISTESTCEN, Pt. Mugu, CA.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605862N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E,N Instrumentation Modernization
PROJECT NUMBER: W0566 PROJECT TITLE: NAVAIR Instrumentation
and Material Support

C. (U) DESCRIPTION: This is a continuing project that supports energy conservation and environmental compliance and pollution prevention related projects at Naval Air Test Center (NATC), Patuxent River, MD; Pacific Missile Test Center (PMTC), Point Mugu, CA; Naval Weapons Center (NWC), China Lake, CA; Naval Air Propulsion Center (NAPC), Trenton, NJ; and Atlantic Underwater Test & Evaluation Center (AUTEC), Andros Island, Bahamas. This project also supports instrumentation/equipment and minor construction and alterations at the Naval Weapons Evaluation Facility (NWEF), Albuquerque, NM.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Provided funding to NATC, PMTC, NWC, NAPC for environmental protection and energy conservation projects. The environmental protection projects provide compliant storage equipment and facilities for hazardous waste, repair/replacement of Polychlorinated Biphenols (PCB) transformers, and removal/replacement of leaking underground storage tanks in compliance with U.S. Codes. The energy conservation projects provide replacement of obsolete equipment with more cost efficient equipment. Funding was also provided to Naval Weapons Evaluation Facility, (NWEF), Albuquerque, NM, for Minor Construction/Alterations including replacement of wiring in some office spaces, and provided required security improvements and procured/replaced aircraft instrumentation equipment to meet minimum operational and safety requirements for NWEF aircraft.

2. (U) FY 1992 Program: Provide funding to NATC, PMTC, NWC, AUTEC for energy conservation projects and environmental requirements which are increasing in number and complexity. Activities must comply with state and local regulations as well as federal regulations. Projects include compliant storage and spill containment equipment and facilities for hazardous waste, repair/replacement of PCB transformers, and remove/replace leaking underground storage tanks at the RDT&E activities in compliance with U.S. Codes. Provide support, approximately \$200K to NWEF to maintain aircraft instrumentation equipment and to meet operational and safety requirements for complete Minor Construction/Alterations for office space wiring and security improvements at NWEF as the downsizing of the facility starts.

3. (U) FY 1993 PLANS: Continue to provide funding to enable activities to comply with recent changes to environmental laws and regulations. Continuing project requirements include compliant storage equipment and facilities for hazardous waste, repair/replacement of PCB transformers, removal/replacement of leaky underground storage tanks. Support NWEF aircraft instrumentation requirements as the transfer to China Lake continues.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NWEF, Albuquerque, NM; NATC, Patuxent River, MD; PMTC, Point Mugu, CA; NWC, China Lake, Ca; AUTEC, Andros Island, Bahamas. CONTRACTORS: Various small contracts for instrumentation equipment, and environmental/energy projects and equipment.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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PROGRAM ELEMENT TITLE: RDT&E, N Instrumentation Modernization
PROJECT NUMBER: X0799 PROJECT TITLE: SPAWAR Material Support

C. (U) DESCRIPTION: This project provides for shipping newly procured research and development materials from the manufacturers to the first destination (First Destination Transportation Cost).

D. (U) PROGRAM ACCOMPLISHMENT AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Provided First Destination Transportation funding as described above.

2. (U) FY 1992 PROGRAM: Provided support as described above.

3. (U) FY 1993 PLANS: Provided support as described above.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: Not applicable.

F. (U) RELATED ACTIVITIES: None.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605862N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E, N Instrumentation Modernization
PROJECT NUMBER: X0833 PROJECT TITLE: Instrumentation and Material Support

C. (U) DESCRIPTION: Provides supplemental support for Surveillance Test and Integration Center (STIC), formerly the Acoustic Research Center, San Diego, CA. Supports procurements which do not qualify for the Capital Purchases Program (CPP) or direct project funding at the Research and Development Centers.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Supported the Surveillance Test and Integration (STIC) and R&D Centers' planning network at a reduced level.
2. (U) FY 1992 PROGRAM: Reduce support to STIC but continue to provide support for interlaboratory projects. This is the last year for STIC support.
3. (U) FY 1993 PLANS: Continue to provide support for interlaboratory projects.
4. (U) PROGRAM TO COMPLETION: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: NAVOCEANSYSCEM, San Diego, CA; DTRCEN, Bethesda, MD.

F. (U) RELATED ACTIVITIES: None.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605862N BUDGET ACTIVITY: 6 PROGRAM
ELEMENT TITLE: RDT&E,N Instrumentation Modernization
PROJECT NUMBER: S1957 PROJECT TITLE: Large Cavitation Channel
(LCC)

C. (U) DESCRIPTION: This project funds the Large Cavitation Channel (LCC) facility operated by the David Taylor Research Center. The LCC is a pressure-controlled water channel similar to a windtunnel used for acoustic and hydrodynamic testing of large scale models of surface ships, submarines, and torpedoes. At present, propellers and other propulsors are tested in cavitation tunnels using small model sizes in the absence of the hull and appendages. In the past, it has been possible to account for the influence of the hull on the model propeller tests, by using an extensive background of practical experience. Now, however, high performance hulls, appendages, and propulsors are being designed to meet special requirements, such as reduced noise, reduced vibration, and high efficiency, to which existing data and experience do not apply. Present test techniques have failed to predict or resolve problems of cavitation erosion and vibration and noise problems. These particular failures have increased costs and delayed for a year or more bringing some ships into full service. The cavitation channel will provide the capability to measure the acoustic and hydrodynamic performance of hull, propulsor, and appendages as an integrated package. Thus, model tests in the channel will reliably predict full scale performance, which will enable quieter and more efficient ship designs to be developed while avoiding the above mentioned problems.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:
 - a. Completed channel construction.
 - b. Conducted calibration and "shakedown" tests.
 - c. Initiated propeller tests.
 - d. Operated the LCC with property leasing agreements.
2. (U) FY 1992 PROGRAM: Continue LCC operations and leasehold payments.
3. (U) FY 1993 PLANS: Continue LCC operations and leasehold payments.
4. (U) PROGRAM TO COMPLETION: Continue LCC operations and purchase of the facility. This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: David Taylor Research Center, Bethesda, MD
CONTRACTOR: CBI NA-COW, INC, Memphis, TN.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable. This is a nonacquisition program.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605863N

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE: RDT&E,N SHIP AND AIRCRAFT SUPPORT

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R1999 OCEAN, RESEARCH, SHIP SUP	0	15,000	4,506	720	20,226
S0354 RDT&E SHIPS SUPPORT	13,629	13,875	22,750	CONT.	CONT.
W0568 RDT&E AIRCRAFT FLIGHT HOURS	12,800	10,904	12,552	CONT.	CONT.
W0569 RDT&E AIRCRAFT SUPPORT	45,532	46,966	59,483	CONT.	CONT.
X2099 CRITICAL SEA TEST II, SHIP SPT	0	8,798	9,264	33,339	51,401
TOTAL	71,961	95,543	108,555	CONT.	CONT.

B. (U) DESCRIPTION: This continuing program provides support for ships and platforms required to accommodate Research, Development, Test and Evaluation (RDT&E) of new systems. The RDT&E ships and aircraft inventory is required to adequately test new and improved weapon systems, stay current with the threat, and increase warfighting capability of the fleet. The program provides integrated logistics support of aircraft at selected field activities; provides Depot level rework of aircraft, engines, components for the Navy inventory of RDT&E aircraft; and provides support ships and aircraft bailed to contractors for Navy RDT&E projects. The program supports the cost for leasing and operating two ships in support of Critical Sea Test II. The program funds include aircrew training/proficiency, fuel, supplies, equipment, modification, repair, Aviation Depot Level Repairables, Special Flight Test Instrumentation Pool equipment, overhaul of ships and aircraft, as well as Organizational, Intermediate, and Depot maintenance of ships and aircraft in the Navy RDT&E inventory.

(U) Also beginning in FY 1993 this program element will support two Research and Development oceanographic ships which provide services to Navy Laboratories, systems commands and Navy-funded laboratories for basic research, detailed site and weapon specific investigation and fleet support.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605863N

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE: RDT&E,N Ship and Aircraft Support

PROJECT NUMBER: R1999

**PROJECT TITLE: Oceanographic Research
Ship Support**

C. (U) DESCRIPTION: This program provides support for ships and platforms required to accommodate research, development, test and evaluation (RDT&E) of new systems. The ships support both Navy Laboratory R&D programs and the Office of the Chief of Naval Research (OCNR) Science and Technology research program for ocean science. The Office of Naval Research (ONR) has management responsibility for Navy-owned AGORS which are chartered to academic institutions for scheduling and operation in support of national ocean science programs, including Navy funded research support by ONR and the Office of Navy Technology. In addition, the Commander Naval Oceanography Command (CNOC) schedules Navy-owned/Navy-contracted pool AGOR ships outfitted for general purpose oceanographic work in support of OCNR laboratory R&D programs. In the past, Navy-contracted AGOR ship operations were block funded from O&N,N funds, but this cost is now going to be funded from RDT&E,N.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) **FY 1991 ACCOMPLISHMENTS:** Not applicable.

2. (U) **FY 1992 PROGRAM:** Complete overhaul/refit of AGOR 14/15.

3. (U) **FY 1993 PLANS:** Fund the baseline costs for ship use by OCNR R&D community.

4. (U) **PROGRAM TO COMPLETION:** In FY 1994, prepare the USNS BARLETT (AGOR 13) for deactivation. Future ship support for RDT&E will be accomplished by new multi-purpose ships.

E. (U) WORK PERFORMED BY: IN-HOUSE: CNOC, Bay St. Louis, MS.

CONTRACTORS: Woods Hole Oceanographic Institution, Woods Hole, MA.

F. (U) RELATED ACTIVITIES: Not applicable.

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605863N

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE: RDT&E,N Ship and Aircraft Support

PROJECT NUMBER: 80354

PROJECT TITLE: RDT&E Ships Support

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
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80354	RDT&E Ships Support	13,629	13,875	22,750	CONT.	CONT.
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B. (U) DESCRIPTION: This project provides for operation and maintenance of platforms used as Sea Based Test Sites in support of the Navy RDT&E program. These are USS DOLPHIN (AGSS 555), the Floating Instrumentation Platform (FLIP) and the Oceanographic Research Buoy (ORB). EX-USS DECATUR (DDG-31) is being supported by this line as the Self-Defense Test Ship (SDTS). Testing aboard these platforms reduces the number of fleet units required to support RDT&E efforts. In the case of the SDTS, it provides the capability of testing self defense weapons systems to within their minimum ranges. A major cost of this project is regularly scheduled ship overhauls. The USS DOLPHIN will be overhauled during FY 92-94. The remainder of the funds are used for purchase of supplies and equipment, fuel and petroleum products, repairs and supporting modifications. Most costs are fixed and are associated with simply having these platforms in the inventory. A lesser portion varies with the tempo and type of ship operations and provides for system improvements and replacement planning. The nature of the operation is determined by the overall Navy R&D testing program. The Montreal Protocol (1989) and the Clean Air Act of 1990 require cessation of Chloro Fluoro Carbon/Hydro Chloro Fluoro Carbon venting in 1992 and production in 1997. USS DOLPHIN, with it's unique Thermoelectric Air Conditioning (TEAC) plant, is actively involved in NAVSEA's efforts to comply with these laws. USS DOLPHIN's TEAC system is being evaluated for use on Navy submarines and surface ships and will act as a test bed for future designs.

(U) The current and projected Anti-Ship Cruise Missile (ASCM) threat requires self-defense weapon systems capable of adequately countering the ASCM's into the year 2000. The National Defense Authorization Act for FY 87, section 910, "Testing of Certain Weapons System and Munitions" requires live-fire lethality testing of major weapons systems. Operational and safety constraints limit realistic live-fire lethality testing with manned U.S. Navy ships and thus drive the requirement for having an afloat, unmanned, remotely controlled Self-Defense Test Ship (SDTS) (USS DECATUR will be converted to the SDTS). The SDTS plans call for testing Close-In-Weapons System (CIWS), NATO Sea Sparrow, Rolling Airframe Missile (RAM), SLQ-32(V3), and future short range AAW systems against realistic threat presentations in an at-sea environment.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605863N

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE: RDT&E, N Ship and Aircraft Support

PROJECT NUMBER: 80354

PROJECT TITLE: RDT&E Ships Support

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) USS DOLPHIN continued to support near ocean bottom operations and other RDT&E programs, modeling sonar propagation, testing sensors, Unmanned Underwater Vehicles (UUVs), communication systems, and machinery systems. USS DOLPHIN conducted TEAC testing, supported laser bottom imaging, DARPA's initiative in offboard sensors and DARPA's Tactical Airborne Laser Communications Program in which two-way laser communications between a submerged submarine and an aircraft were achieved for the first time. USS DOLPHIN replaced four major SUBSAFE hull valves, TEAC modules, completed the procurement of spare main propulsion battery cells, and material to support the FY 92 overhaul.

b. (U) FLIP/ORB conducted underwater acoustic and noise phenomena research to support ASW needs. The yearly drydock inspection for FLIP was conducted to monitor fatigue life and repair areas.

c. (U) SDTS conversion of EX-USS DECATUR began second quarter FY 1991 at NAVSEA DET NISMF Bremerton WA. Work was accomplished that did not require the shipyard availability. Long lead procurements for propulsion diesels and generator sets were awarded. Work scope was defined for the shipyard availability to begin second quarter FY 1992 at Puget Sound Naval Shipyard.

2. (U) FY 1992 PROGRAM:

a. (U) USS DOLPHIN will continue to support near ocean bottom operations and other RDT&E programs, modeling sonar propagation, testing sensors, communication systems, and machinery systems. USS DOLPHIN will continue TEAC testing, DARPA's initiatives in offboard sensors and will conduct experiments to achieve high data rate communications via green laser with DARPA's UUV while submerged. USS DOLPHIN will also attempt to control the UUV while submerged. USS DOLPHIN will perform planning and design work and procure High Pressure Air Compressors, TEACs and other material required to support the FY 1992 overhaul. USS DOLPHIN will have a Required Overhaul (ROH) during late FY 1992 to early FY 1994.

b. (U) FLIP/ORB will continue to conduct underwater acoustic and noise phenomena research to support ASW and weapons needs. Drydock inspection will be conducted on FLIP.

c. (U) SDTS (EX-USS DECATUR) shipyard conversion effort will start second quarter. Tasks scheduled for completion during the shipyard availability, include refurbishment of ship systems, installation of propulsion and electrical power for ship control. Flight deck installation, mast modifications, and ventilation changes may be deferred shipyard work to be accomplished in FY 1993.

3. (U) FY 1993 PLANS:

a. (U) USS DOLPHIN - Regular overhaul continues at Mare Island Naval Shipyard. (Testing and certification scheduled to complete in FY 1994.)

b. (U) FLIP/ORB will conduct underwater acoustic and noise phenomena research to support ASW and weapons needs. Drydock inspection of FLIP is planned.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605863N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E, N Ships and Aircraft Support
PROJECT NUMBER: 80354 PROJECT TITLE: RDT&E Ships Support

c. (U) Upon completion of the conversion, SDTS will be ready for outfitting and operations. Propulsion and steering will be remotely controllable; electrical power, heating, ventilation, and air conditioning, (HVAC), and cooling water will be ready to support all combat systems as well as "hotel" loads. SDTS shipyard conversion efforts will complete. The SDTS will be towed to its berth at Port Hueneme, CA. Installations of combat systems and remote control systems will begin with completion of this effort in FY 94. Initial Operational Capability (IOC) is now scheduled for FY 94.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVSHIPWPNSYSENGSTA Port Hueneme, CA; PACMISTESTCEN, Point Mugu, CA; SUPSHIP, Seattle, WA; NAVSHIPYD, Mare Island, Vallejo, CA; NAVOCEANSYSCEN, San Diego, CA; Puget Sound Naval Shipyard, Bremerton, WA; David Taylor Research Center, Carderock and Annapolis, MD; NRL, Washington, DC. CONTRACTORS: Applied Research Laboratories, Austin, TX; Charles Stark Draper Laboratories, Cambridge, MA; University of California, San Diego, CA; Johns Hopkins University Applied Physics Laboratory, Laurel, MD.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) Technology Changes: None
2. (U) Schedule Changes: Higher than anticipated conversion costs for the SDTS, from private sector bids, caused the conversion effort to be assigned to Puget Sound Naval Shipyard. Resultant delay has brought about higher labor rates which have driven up the cost. FY 93 funds originally intended for fitting out may be used for the conversion resulting in a 6-12 month delay in IOC to FY 94. This will depend upon actual incurred costs once in the shipyard.

3. (U) Cost Changes: Not applicable.

F. (U) PROGRAM DOCUMENTATION: Not applicable

G. (U) RELATED ACTIVITIES: DECATUR: Program Element 0604369N, (5 Inch Rolling Airframe Missile); Program Element 0604361N (NATO SEA SPARROW); Program Element 0604358N (Close In Weapon System). FLIP: Program Element 0602314N (ASW Technology Support); Advanced Undersea Weapons Guidance and Control OT3A, ONT High Gain Initiative OT3B, and Non-Acoustic ASE OR3A. Program Element 0602435N (Oceanographic and Atmospheric Support); ONT High Gain Initiative OT3B, ASW Environmental Technology Block RL3B. Program Element 0602111N (Surface and Aerospace Target Surveillance Support); AAW/ASUW Technology OR1A.

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605863N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E, N Ships and Aircraft Support
PROJECT NUMBER: W0568 PROJECT TITLE: RDT&E Aircraft Flight Hours

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0568	RDT&E ACFT FLT HOURS	12,800	10,904	12,552	CONT.	CONT.

B. (U) DESCRIPTION: This non-acquisition project provides aircraft flight hours/operating support for RDT&E programs at seven NAVAIR/OCNR activities. Support includes aircrew training, pilot Naval Air Training and Operating Procedures Standardization (NATOPS) proficiency/currency requirements, annual simulator training, transition to new aircraft types, Organizational level and Intermediate level maintenance and associated consumables, petroleum, fuel and lubricants.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: 9,500 flight hours for pilot training/qualification and for testing support of RDT&E projects were flown.

a. (U) Provided the maintenance and support for aircraft required by RDT&E Projects.

2. (U) FY 1992 PROGRAM: Plan to fly 9,050 flight hours in FY 1992.

a. (U) Continue providing the maintenance and support for aircraft required by RDT&E Projects. Updated aircraft replacement to continue.

3. (U) FY 1993 PLANS: Plan to fly 9,600 flight hours in FY 1993. The increase in flight hours is due to changes in aircraft inventory. Newer, more sophisticated aircraft which require more flight hour training/qualifications are replacing older, less complicated aircraft (e.g., F/A-18 replacing A-7).

a. (U) Continue providing the maintenance and support for aircraft required by RDT&E Projects. Updated aircraft replacement to continue.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRDEVCON, Warminster, PA; NAVCOASTSYSCEN, Panama City, FL; PMTC, Point Mugu, CA; NRL, Washington, DC; NAEC, Lakehurst, NJ; NAVWPNEVALFAC, Albuquerque, NM; and NAVTRASYSN, Orlando, FL.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605863N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: RDT&E, N Ships and Aircraft Support
PROJECT NUMBER: W0568 PROJECT TITLE: RDT&E Aircraft Flight Hours

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable
2. (U) SCHEDULE CHANGES: Not applicable.
3. (U) COST CHANGES: The FY 1993 \$-1,039K decrease associated with pricing adjustments.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: Not applicable.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605863N

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE: RDT&E Ships and Aircraft Support

PROJECT NUMBER: W0569

PROJECT TITLE: RDT&E Aircraft Support

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0569	RDT&E ACFT SPT	45,532	46,966	59,483	CONT.	CONT.

B. (U) DESCRIPTION: This continuing project provides for the Depot level maintenance and rework of over 200 Navy RDT&E fixed and rotary wing aircraft required to accommodate test and evaluation of weapons systems in development. It also supports engines, aircraft material condition and field inspections, and emergency repair. In addition, it provides for Individual Material Readiness List (IMRL) tools and support equipment needed to perform aircraft maintenance; modification of in-service aircraft and other systems for application to and compatibility with RDT&E requirements; Special Flight Test Instrumentation Pool (SFTIP) equipment, shared/reused by programs to reduce/eliminate procurement lead times and save money when provided as GFE; Aviation Depot Level Repairables (AVDLRs), which are spare/replacement installed aircraft parts and components; and support of aircraft bailed to contractor facilities. The project is funding the RDT&E modification of three Naval Research Lab (NRL) replacement P-3 aircraft.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: The following programs were supported: Depot level maintenance/SDLM, IMRL, engine support, SFTIP and AVDLRs for over 200 aircraft in the RDT&E inventory, and contractor bailed aircraft (40 aircraft) support including consumables. Due to the high pass rate of material condition/Aircraft Service Period Adjustment (ASPA) inspections in the prior year, more aircraft of the RDT&E inventory will reach ASPA inspection numbers 3 and 4 in FY92. This is a prime indication that more aircraft will experience failures, requiring SDLM induction. As complicated RDT&E aircraft, these aircraft will cost more than usual to rework. Eight aircraft were reworked with available resources. The RDT&E conversion of the first NRL P-3 was started. The Naval Air Logistics Command Information System (NALCOMIS) was implemented at the Naval Air Test Center (NATC).

2. (U) FY 1992 PROGRAM: The program will support the following: Depot level maintenance/SDLM, IMRL, engine support, SFTIP and AVDLRs for 200 aircraft in the RDT&E inventory, and contractor bailed aircraft (40 aircraft) support including consumables. The cost of reworks and maintenance support is rising, and is higher for newer individual aircraft types that are entering the inventory. Thirteen aircraft are projected to be reworked, and the RDT&E conversion of replacement NRL P-3 aircraft will continue. NALCOMIS implementation continues, and the Maintenance Training Improvement Program (MTIP) will be implemented for the first RDT&E activity.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605863N

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE: RDT&E Ships and Aircraft Support

PROJECT NUMBER: W0569

PROJECT TITLE: RDT&E Aircraft Support

3. (U) FY 1993 PLANS: The following programs are included: Depot level maintenance/SDLM, INRL, engine support, SFTIP and AVLDRs for 200 aircraft in the RDT&E inventory, and contractor bailed aircraft (40 aircraft) support including consumables. An estimated twenty aircraft will be reworked. RDT&E conversion of NRL P-3 aircraft will continue.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRTESTCEN, Patuxent River, MD; NAVAIRDEVCEN, Warminster, PA; NAVCOASTSYSCEN, Panama City, FL; PACMISTESTCEN, Point Mugu, CA; NRL, Washington, DC; NAVAIRENGCEN, Lakehurst, NJ; NAVWPNCEN, China Lake, CA; NAVWPNEVALFAC, Albuquerque, NM; NUSC DET AUTEC, West Palm Beach, FL; NAVAVNDEPOT, Norfolk, VA; NAVAVNDEPOT, North Island, CA; NAVAVNDEPOT, Pensacola, FL; NAVAVNDEPOT, Cherry Point, NC; NAVAVNDEPOT, Jacksonville, FL; NAVAVNDEPOT, Alameda, CA; DPRO, Stratford, CT; DPRO, Bethpage, NY; DPRO, Ft. Worth, TX; NAVAVNMAINTOFF, Patuxent River, MD.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not applicable.

2. (U) SCHEDULE CHANGES: Not applicable.

3. (U) COST CHANGES: The increase of \$+1,442K is due to pricing adjustments.

F. (U) PROGRAM DOCUMENTATION: Not applicable.

G. (U) RELATED ACTIVITIES: Not applicable.

H. (U) OTHER APPROPRIATION FUNDS: Not applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

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FY 1993 NAVY RDT&E NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605863N

BUDGET ACTIVITY 6

PROGRAM ELEMENT TITLE: RDT&E SHIP/AIRCRAFT SUPPORT

PROJECT NUMBER: X2099

PROJECT TITLE: CRITICAL SEA TEST II,
SHIP SUPPORT

C. (U) DESCRIPTION: The Critical Sea Test (CST) Phase II project provides vital, consolidated at-sea testing for Post-Cold War regional conflict scenarios. This project provides for lease and operating costs for R/V CORY CHOUEST and echo repeater ship. These testing assets are the core of planned IUSS consolidated testing in the future MAGELLAN project. Reduced operating expenses have been achieved for Cory Chouest and full and open competition procurement is planned for echo repeater ship services in FY93.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 PROGRAM: Not applicable

2. (U) FY 1992 PROGRAM:

a. (U) Lease and provide basic operating costs including manning for at-sea support of onboard GFE equipment of the CORY and AMY CHOUEST R&D ships to support two CST at-sea tests.

b. (U) Lease and provide basic operating costs including manning for at-sea support of onboard GFE equipment of the CORY and AMY CHOUEST R&D ships to support two LFA/SURTASS program tests.

c. (U) Lease and provide basic operating costs including manning for at-sea support of onboard GFE equipment of the CORY and AMY CHOUEST R&D ships to support one ADI program test.

3. (U) FY 1993 PLANS:

a. (U) Lease and provide basic operating costs of the CORY CHOUEST and echo repeater R&D ships to support two CST at-sea tests.

b. (U) Support two ONR special research project tests.

c. (U) Support two SURTASS program tests.

d. (U) Support one ADI program test.

4. (U) PROGRAM TO COMPLETION:

a. (U) Support two CST at-sea tests per year in FY 1994 and FY 1995.

b. (U) Support one CST at-sea test in FY 1996.

c. (U) Support SURTASS at-sea tests in FY 1994 and FY 1995.

d. (U) Support ADI at-sea tests in FY 1994 and FY 1995.

e. (U) Demobilize and release assets by end of FY 1996.

E. (U) WORK PERFORMED BY: In-House: COMSPAWARSSYSCOM, Washington, D.C.; Military Sealift Command, Washington, D.C.; NAVOCEANSYSCEN, San Diego, CA; NAVCIVENGLAB, Ft Hueneme, CA. Contractors: The Johns Hopkins University/Applied Physics Laboratory, Laurel, MD; Edison Chouest Offshore, Galliano, LA; GE Government Services, Virginia Beach, VA.

F. (U) RELATED ACTIVITIES: PE 0603747N (Advanced ASW Technology); PE 0603785N (ASW Environmental Acoustical Support (AEAS)); PE 0204311N (Integrated Undersea Surveillance System (IUSS) Development); PE 0603741D (Air Defense Initiative); PE 0603737D (Balanced Technology Initiative); PE 0601153N (Defense Research Sciences).

G. (U) OTHER APPROPRIATION FUNDS: Not applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605864N

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE: Test and Evaluation Support

A. (U) Resources: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0541	AUTEC	49,911	46,961	52,050	CONT	CONT
W0653	PMTC	97,512	95,217	101,276	CONT	CONT
W0654	NATC	77,233	78,684	81,205	CONT	CONT
W0655	NAPC	25,136	24,832	24,621	CONT	CONT
W0657	NWC	67,255	65,830	71,336	CONT	CONT
W2125	T&E	-	12,229	22,738	CONT	CONT
Modernization						
TOTAL		317,047	323,753	353,226	CONT	CONT

B. (U) DESCRIPTION: This program provides institutional Maintenance and Operations (M&O) and Improvement and Modernization (I&M) support for the five test and evaluation activities that make up the Navy portion of the Department of Defense Major Range and Test Facility Base (MRTFB). These five activities are: the Atlantic Undersea Test and Evaluation Center (AUTEC), Andros Island, Bahamas; the Pacific Missile Test Center (PMTC), Point Mugu, CA; the Naval Air Test Center (NATC), Patuxent River, MD; the Naval Air Propulsion Center (NAPC) Trenton, NJ; and the Naval Weapons Center (NWC), China Lake, CA. These test and evaluation activities are chartered to have the capability and capacity to perform the full spectrum of developmental and operational test and evaluation required by Navy research, development and technologically advanced weapon system acquisition and improvement programs. Adequate state-of-the-art and realistic test and evaluation is paramount in providing the operational forces effective weapon systems to counter a dynamic threat environment. Above the level-of-effort institutional M&O, this program develops and acquires the sophisticated instrumentation systems required to test modern advance weapon systems and improvements to existing systems. Also, this program (within project W0653) provides the David W. Taylor Ship Research and Development Center, Bethesda, MD, operation and maintenance support for the Santa Cruz Radar Cross Section (RCS) range, which is designed to provide full-scale cross section RCS measurements of Navy ships in the ocean environment. Also, project W0653 will support target air launch capability for the DC-130 aircraft. These aircraft will provide a Mobile Sea Range environment giving the fleet the capability to conduct Battle Group Exercises at sea in a clear safe area and permitting live fire exercises. Project W2125 provides on-going test and evaluation (T&E) modernization for the MRTFB facilities to correct major deficiencies in T&E capabilities and increase T&E support effectiveness.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605864N

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE: Test and Evaluation Support

PROJECT NUMBER: W0541

PROJECT TITLE: Atlantic Undersea Test
and Evaluation Center

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROG
W0541	AUTEC	49,911	46,961	52,050	CONT	CONT

B. (U) DESCRIPTION: Atlantic Undersea Test and Evaluation Center (AUTEC) provides a deep water test and evaluation facility for making selected underwater acoustic measurements, testing and calibrating sonars, and providing accurate underwater, surface and air tracking data on test participants. AUTEC includes the Weapons Range, Fleet Operational Readiness Accuracy Check Site, Weapons Acoustic Measurement Capabilities and an Ocean Haul Down Facility for large buoyant bodies. The Weapons Range provides three dimensional (undersea, surface, air) precision tracking capability in support of Anti-Submarine Warfare Development Test and Evaluation and Operational Test and Evaluation. Major training operations which include fleet readiness exercises and tactical development trials are also conducted on the weapons range. The Fleet Operational Readiness Accuracy Check Site provides the capability to accurately calibrate and align electronic, optical, acoustic, and navigational systems installed on submarines and surface ships. Naval Underwater Systems Center detachment at West Palm Beach, Florida, provides technical expertise in tracking systems, liaison and test planning with range users, test scheduling, and logistic support.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Continued to maintain and repair the physical plant; purchased critical marine spares; performed marine craft maintenance; continued contract administration support and rental payments to Bahamian government.

b. (U) Continued design/development of the Weapon Noise Measurement System.

c. (U) Continued procurement/installation of a Distributed Data Processing/Communication System.

d. (U) Prepared specification and plan for installation of a Torpedo Launch Tube on an AUTEC vessel to support new development weapon vehicles.

e. (U) Restarted work on Site 1 Expansion at Andros Island, Bahamas.

f. (U) Initiated lease payment of facilities at West Palm Beach.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605864N

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE: Test and Evaluation Support

PROJECT NUMBER: W0541

PROJECT TITLE: Atlantic Undersea Test
and Evaluation Center

2. (U) FY 1992 PROGRAM:

a. (U) Continue to maintain and repair the physical plant; maintain adequate marine spares and marine craft readiness; provide OPSEC maintenance and operations; continue contract administration support and rental payments to Bahamian government.

b. (U) Complete the Weapon Noise Measurement System.

c. (U) Continue the installation of Distributed Data Processing/Communication System.

d. (U) Complete procurement specifications and award contract for the installation of the Torpedo Launch Tube.

e. (U) Complete Site 1 Expansion.

f. (U) Continue lease payment of facilities at West Palm Beach.

3. (U) FY 1993 PLANS:

a. (U) Continue to maintain and repair the physical plant; maintain adequate spares; provide Operations Security maintenance and operations; continue contract administration support and rental payments to the Bahamian government.

b. (U) Continue work on the Distributed Data processing/Communication System.

c. (U) Continue work on the installation of the Torpedo Launch Tube.

d. (U) Initiate work on countermeasure resistant tracking project.

e. (U) Continue lease payment of facilities at West Palm Beach.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: Technical services are performed by the NUSC, Newport, RI; and COMNAVOCEANCOM, Bay St. Louis, MO., CONTRACTORS: The Maintenance and Operation of the AUTEC is being performed by General Electric Government Services, Cherry Hill, NJ.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not Applicable

2. (U) Schedule Changes: Not Applicable

3. (U) Cost Changes: The FY 1993 decrease of \$-2,964K is associated with pricing adjustments, for inflation and DBOF rates, and a reduction to reflect revised support requirements.

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

G. (U) RELATED ACTIVITIES: Not Applicable.

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605864N

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE: Test and Evaluation Support

PROJECT NUMBER: W0653

PROJECT TITLE: Pacific Missile Test Center

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0653	PMTc	97,512	95,217	101,276	CONT	CONT

B. (U) DESCRIPTION: The Pacific Missile Test Center (PMTc), which is now organizationally under the new Naval Air Warfare Center-Weapons Division provides range support to the Department of Defense and other government agencies for launching, tracking and collecting data in guided and ballistic missiles, satellite and space vehicle research, various development, test and evaluation, and training programs. Range support includes: metric tracking of test objects; command, control, and destruct for range safety purposes; communications; frequency interference control and analysis; and data reduction. This project provides the David W. Taylor Ship Research and Development Center (DTRC) operation and maintenance support for the Santa Cruz Radar Cross Section (RCS) Facility. This project also funds DC-130 aircraft supporting target air launch capabilities.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Continued to maintain and repair physical plant; expand over-the-horizon test areas; continued Operations Security (OPSEC) administration; and sustained range operations, development and support.
- b. (U) Continued OPSEC voice and data link improvements.
- c. (U) Continued range control room modernization.
- d. (U) Continued support for the DTRC open ocean RCS facility.
- e. (U) Completed installation and acceptance of the real-time telemetry processing system.
- f. (U) Procured support systems for the real-time computers in the range data processing center. Procured an interim mass memory system. Completed installation and acceptance of the No-Break Power System.
- g. (U) Continued work on the underwater fiber optics link for San Nicholas Island (SNI).
- h. (U) Continued Radio Frequency (RF) communications improvements.
- i. (U) Continued evaluation of telemetry radome installation.
- j. (U) Continued antenna feed replacement improvements.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605864N

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE: Test and Evaluation Support

PROJECT NUMBER: W0653

PROJECT TITLE: Pacific Missile Test Center

2. (U) FY 1992 PROGRAM:

- a. (U) Continue to maintain and repair the physical plant; continue OPSEC administration, sustain range operations, development and support.
- b. (U) Complete OPSEC voice data link improvements.
- c. (U) Complete and evaluate prototype of modernized and refurbished range control room.
- d. (U) Continue support for the DTRC open ocean RCS Facility.
- e. (U) Initiate construction (cable laying) phase of the underwater fiber optics link for SNI (supports OPSEC requirements).
- f. (U) Continue RF communications improvements.
- g. (U) Initiate first of two procurement phases of the telemetry RF feed replacement program (supports TRIDENT and over the horizon requirements).
- h. (U) Procure Advance Combat Direction System (ACDS) software development system to support compatibility with ACDS equipped fleet units.
- i. (U) Initiate first phase of three phase Uninterruptable Power Source program to support range operations and range safety requirements.
- j. (U) Initiate replacement of obsolete and non-supportable interface between instrumentation tracking radars and range central computers.
- k. (U) Procure two of five digital interfaces for range surveillance radars (supports ACDS improvement program).
- l. (U) Initiate replacement/upgrade of multilateration data link controller to support over the horizon Time Space Position Indication requirements (supports implementation of tri-service Range Application Joint Program Global Positioning System (RAJPO GPS) program).

3. (U) FY 1993 PLANS:

- a. (U) Continue to maintain and repair the physical plant, continue OPSEC administration, sustain range operations, development and support.
- b. (U) Procure replacement of central plant air conditioning systems for range operations center.
- c. (U) Initiate second phase of three Uninterruptable Power Source program to support range operations and protect range instrumentation and computer systems.
- d. (U) Procure ACDS consoles for range rooms to support compatibility with fleet ACDS equipped units (provides Joint Tactical Information Distribution System capability).
- e. (U) Complete multilateration data link controller replacement (supports RAJPO GPS and Navy training Large Area Training Range requirements).
- f. (U) Complete replacement of interface between instrumentation tracking radars and range central computers.
- g. (U) Support target air launch capability via DC-130 aircraft.
- h. (U) Complete telemetry RF feed replacement (second phase of procurement)

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605864N

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE: Test and Evaluation Support

PROJECT NUMBER: W0653

PROJECT TITLE: Pacific Missile Test Center

- i. (U) Complete range control room modernization.
- j. (U) Continue support for DTRC open ocean RCS facility.
- k. (U) Continue communication improvements.
- l. (U) Initiate target command and control system refurbishment (replace deteriorated command destruct antennas).
- m. (U) Complete procurement of digital interfaces for range surveillance radars (supports ACDS improvements).
- n. (U) Complete the underwater fiber optics link for San Nicolas Island (supports OPSEC requirements).

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: PACMISTESTCEN, Point Mugu, CA., and NAVAIRSTA, Point Mugu, CA., (including outlying field, San Nicholas Island). CONTRACTORS: Computer Sciences Corporation, Los Angeles, CA; UNISYS, New York, NY; and SRS Technology, Newport Beach, CA; Grumman Technical Services, Titusville, FL; Xerox Corporation, McLean, Va.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not Applicable.
2. (U) Schedule Changes: Not Applicable.
3. (U) Cost Changes: The FY 1993 increase of \$+7,002K reflects funds to support the DC-130 aircraft, pricing adjustments, for inflation and DBOF rates, and an adjustment to properly finance program requirements, for which funding was erroneously reduced in the previous submit.

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

G. (U) RELATED ACTIVITIES: Program Element 0604940D, Test Instrument Development: initiate development, procurement, and implementation of fixed and mobile threat simulators.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE CONT	TOTAL PROGRAM CONT
(U) MILCON -	2,070	-	-		

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605864W

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE: Test and Evaluation Support

PROJECT NUMBER: WO654

PROJECT TITLE: Naval Air Test Center

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
WO654	NATC	77,233	78,684	81,205	CONT	CONT

B. (U) DESCRIPTION: The Naval Air Test Center (NATC), Patuxent River, which is now organizationally under the new Naval Air Warfare Center - Aircraft Division, performs development, test and evaluation of the total aircraft weapon system, including air vehicles systems, mission systems, equipment, subsystems, components, related support systems, and integrated logistic support elements; provides technical advice and assistance to the Naval Air Systems Command, the Board of Inspection and Survey, other agencies and contractors; assists other Research, Development, Test and Evaluation and Operational Test and Evaluation (T&E) activities; and, conducts in-house technical projects. This project funds facility costs not chargeable to the user. NATC has extensive airfield, flight test range, and aircraft system simulation laboratories.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Continued support for maintenance and repair of facilities.
- b. (U) Continued improvement of target control systems.
- c. (U) Continued improvements of the Range Electronic Warfare (EW) System including enhancements of the instrumentation data system, threat emitters, and computers.
- d. (U) Continued improvements of the flight test range optical and radar system.
- e. (U) Initiated procurement for the data computation and control system for the Flight Test Range Operations Center.
- f. (U) Continued OPSEC procurement and installation.
- g. (U) Continued procurement of T&E Data Processing Equipment.
- h. (U) Procured and installed Air Anti-Submarine Warfare Interoperability Center (AASWIC) hardware components.
- i. (U) Procured and installed improved hardware components for aircraft weapon system test laboratories.
- j. (U) Initiated procurement of integrated aircraft weapon system test components.
- k. (U) Continued update of the Electromagnetic Environmental Effect (E3) facility.
- l. (U) Completed upgrades for the Manned Flight Simulator.
- m. (U) Continued System Rehabilitation and Modernization support for existing test facilities/capabilities.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605864N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Test and Evaluation Support
PROJECT NUMBER: WO654 PROJECT TITLE: Naval Air Test Center

2. (U) FY 1992 PROGRAM:

- a. (U) Continue support for maintenance and repair of facilities.
- b. (U) Continue update of existing Target Systems.
- c. (U) Continue procurement of Range EW System components.
- d. (U) Continue Flight Test Range improvements.
- e. (U) Continue procurement for the data computation and control system for the Flight Test Range Operations Center.
- f. (U) Continue support for the AASWIC.
- g. (U) Complete Operations Security (OPSEC) procurement and installation.
- h. (U) Continue procurement and installation of Integrated Aircraft Weapon System test components.
- i. (U) Continue improvement in T&E Data Processing.
- j. (U) Continue update of the E3 facility.
- k. (U) Continue System Rehabilitation and Modernization support for existing test facilities/capabilities.

3. (U) FY 1993 PLANS:

- a. (U) Continue support for maintenance and repair of facilities.
- b. (U) Continue Target Control Systems improvements.
- c. (U) Continue the Range EW System improvements.
- d. (U) Continue Flight Test Range improvements.
- e. (U) Continue Range Operations System improvements.
- f. (U) Continue support for AASWIC.
- g. (U) Continue procurement and installation of Integrated Aircraft Weapon Systems test components.
- h. (U) Continue improvements in Data Processing.
- i. (U) Continue update of the E3 facility.
- j. (U) Continue System Rehabilitation and Modernization support for existing test facilities/capabilities.
- l. (U) Initiate upgrades of the High Energy Physics Lab.
- m. (U) Initiate upgrades of the range support aircraft instrumentation project.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: PACMISTESTCEN, Point Mugu, CA; NAVAIRPROPCEN, Trenton, NJ; NAVWPNCEN, China Lake, CA; and NRL, Washington, D.C. CONTRACTORS: Southern Maryland Electric, Hughesville, MD; Dyncorp, Reston, VA; Grumman Corporation, Bethpage, NY; Universal Fuel, Lexington Park, MD, and Holmes & Narver, Inc. Orange County, CA.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605864N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Test and Evaluation Support
PROJECT NUMBER: WO654 PROJECT TITLE: Naval Air Test Center

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not Applicable
2. (U) Schedule Changes: Not Applicable
3. (U) Cost Changes: The FY-93 increase of \$+9,198K reflects funds to reduce the critical backlog of repair projects, including the airfield runway, pricing adjustments, for inflation and DBOF rates, and an adjustment to properly finance program requirements for which funding was erroneously reduced in the previous submit.

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

G. (U) RELATED ACTIVITIES: Program Element 0604940D, Test Instrument Development: Development of a Common Airborne Instrumentation System, a multi-service project managed by Navy and NATC. Improvement and Modernization of Air Combat Environment Test and Evaluation components laboratories: Offensive Sensor Lab; Closed Loop Lab; Air Combat Environment Test and Evaluation Facility Operations and Control Center, Communications, Navigation and Identification Lab; Advanced Flight Simulator; Aircrew Systems Evaluation Facility.

H. (U) OTHER APPROPRIATION FUNDS: (Dollars in Thousands)

	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE CONT	TOTAL PROGRAM CONT
(U)MILCON	11,040	-	-		

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

J. (U) MILESTONE SCHEDULE: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605864N

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE: Test and Evaluation Support

PROJECT NUMBER: W0655

PROJECT TITLE: Naval Air Propulsion Center

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W0655 NAPC	25,136	24,832	24,621	CONT	CONT

B. (U) DESCRIPTION: Naval Air Propulsion Center, Trenton (NAPC), which is now organizationally under the new Naval Air Warfare Center-Aircraft Division, provides complete technical and engineering support for air-breathing propulsion systems, including their accessories and components, and fuels and lubricants by: managing and performing applied research and development leading to new propulsion systems; conducting propulsion system tests and evaluation as necessary to ensure successful mission accomplishment; and assisting in the determination of corrective action necessary for the resolution of operational service problems. NAPC has a Memorandum of Understanding (MOU) with the U.S. Army Aviation System Command, St. Louis, MO, and the Arnold Engineering Development Center, Arnold Air Force Base, TN. These MOUs formalize a working relationship in the area of aircraft propulsion development testing and evaluation and in areas of information exchange. It defines mutually beneficial areas for management, technical interfaces, cooperation and establishes responsibilities.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Leased temporary facilities for personnel. The existing administrative/engineering building was declared uninhabitable by Northern Division, Naval Facilities Engineering Command due to structural problems.

b. (U) Maintenance and repair of RDT&E plant facilities and equipment: Initiated cooling tower replacement; replaced fire protection system in test wing; removed asbestos; replaced exhaust header pit foundation deck; replaced high-voltage circuit breakers in blower wing; replaced exhaust rotors; maintenance of instrumentation data system and computers.

c. (U) Continued data system improvements.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605864N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Test and Evaluation Support
PROJECT NUMBER: W0655 PROJECT TITLE: Naval Air Propulsion Center

2. (U) FY 1992 PROGRAM:

- a. (U) Sustain capabilities with maintenance and repairs and continue to procure equipment required to sustain plant operation and support engine testing.
- b. (U) Lease facilities for engineering and administrative personnel.
- c. (U) Repair cooling tower.
- d. (U) Maintenance and repair of instrumentation and data systems.

3. (U) FY 1993 PLANS:

- a. (U) Sustain capabilities with maintenance and repairs and continue to procure equipment required to sustain plant operation and support engine testing.
- b. (U) Lease facilities for engineering and administrative personnel.
- c. (U) Repair cooling tower.
- d. (U) Maintenance and repair of instrumentation and data systems.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVAIRPROPCEN, Trenton, New Jersey.
CONTRACTORS: TUCS Cleaning Services Inc., West Orange, NJ; USA Company, Clifton, NJ; Disposal Systems Inc., Freehold, NJ; DOWCO, Newfield, NJ; National Waste Disposal Inc., Trenton, NJ.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

- 1. (U) Technology Changes: Not Applicable
- 2. (U) Schedule Changes: Not Applicable
- 3. (U) Cost Changes: Not Applicable

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

G. (U) RELATED ACTIVITIES: None.

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605864N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Test and Evaluation Support
PROJECT NUMBER: WO657 PROJECT TITLE: Naval Weapons Center

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
WO657 NWC	67,255	65,830	71,336	CONT	CONT

B. (U) DESCRIPTION: The Naval Weapons Center, China Lake (NWC) (Ranges), which is now organizationally under the new Naval Air Warfare Center-Weapons Division, is the principal Navy National Range facility for the test and evaluation of airborne weapon systems, aircraft and weapon integration, weapons, components, parachute and aircraft escape system. Test capabilities include: air launched missile and aircraft ranges; rocket motor, warhead and other missile component test facilities; the Electronic Warfare Threat Environment Simulation (EWTES); and, a state-of-the-art Static Radar Cross Section (RCS) measurement facility. This project pays for all range operations, maintenance and improvement costs not directly associated with a specific user program.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Continued improvement projects intended to sustain existing test capabilities: Operations Security (OPSEC); EWTES Instrumentation; Range Communications System; Integrated Target Control System reliability and interoperability; RCS radar upgrades; ordnance test capabilities; aircraft missile range electro-optical tracking; real-time processing, data communication and telemetry receiving instrumentation; parachute testing; and telemetry development laboratory.

b. (U) Completed the telemetry receiving station at EWTES.

c. (U) Completed the data communications project on the aircraft/missile range to augment the oversaturated underground cable system.

d. (U) Initiated the joint service of R-2508 Mosaic Direct Access Radar Channel (MDARC) upgrade.

2. (U) FY 1992 PROGRAM:

a. (U) Continue improvement projects intended to sustain existing test capabilities: OPSEC; EWTES Instrumentation; Range Communications Systems; Integrated Target Control System reliability and interoperability; ordnance test capabilities; aircraft/missile range electro-optical tracking; real-time processing, data communication and telemetry receiving instrumentation; parachute testing; and telemetry development.

b. (U) Complete joint service R-2508 MDARC upgrade.

c. (U) Initiate a project to replace aging tracking mounts.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605864N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Test and Evaluation Support
PROJECT NUMBER: W0657 PROJECT TITLE: Naval Weapons Center

3. (U) FY 1993 PLAN:

- a. (U) Continue improvement projects intended to sustain existing test capabilities as per FY 1992 (paragraph a.).
- b. (U) Complete the initial goals of the OPSEC project to provide the capability of conducting secure test operations.
- c. (U) Continue to replace aging tracking mounts.
- d. (U) Initiate improvements to the EWTES real-time data processing system.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVWPNCEN, China Lake, CA.
CONTRACTORS: ERAI, Ridgecrest, CA; COMARCO, Ridgecrest, CA; Boeing Computer Support Services, Ridgecrest, CA; LORAL Electronic Systems, Ridgecrest, CA.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) Technology Changes: Not Applicable
2. (U) Schedule Changes: Not Applicable
3. (U) Cost Changes: The FY 1993 increase of \$+1,283K reflects pricing adjustments, for inflation and DBOF rates, and an adjustment to properly finance program requirements for which funding was erroneously reduced in the previous submit.

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

G. (U) RELATED ACTIVITIES: New test capability development at NAVAIRWARCEN-WPNS China Lake is supported by Program Element 0604940D, Test Instrumentation Development: Development of advanced design Anti-Radiation Missile (ARM) targets: Test Technology Development and demonstration: Development of Metric Infrared Imaging System.

H. (U) OTHER APPROPRIATION FUNDS: (DOLLARS IN THOUSANDS)

	FY 91	FY 92	FY 93	TO	TOTAL
	ACTUAL	ESTIMATE	ESTIMATE	COMPLETE	PROGRAM
(U) MILCON	17,585	-	-	CONT	CONT

I. INTERNATIONAL COOPERATIVE AGREEMENT: Not Applicable.

J. (U) MILESTONE SCHEDULE: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605864N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Test and Evaluation Support
PROJECT NUMBER: W2125 PROJECT TITLE: Test and Evaluation Modernization

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W2125 T&E Modernization	-	12,229	22,738	CONT	CONT

B. (U) DESCRIPTION: This project provides for the modernization of major Navy test and evaluation assets and will provide for improvements at the Major Range and Test Facility Base (MRTFB) facilities to correct major deficiencies, improve Test and Evaluation (T&E) capabilities and increase T&E support effectiveness.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) This project was previously funded under P.E. 0604940D, Central Test and Evaluation Improvement Program (CTEIP).

2. (U) FY 1992 PROGRAM:

a. (U) Provide a Navy Range Global Positioning (GPS) tracking system at four Navy MRTFB facilities. These activities are: Naval Air Test Center, Pacific Missile Test Center, Naval Weapons Center, and Atlantic Undersea Test and Evaluation Center. This system will: provide expanded time space position information capabilities at the Navy ranges; provide interoperability with other Department of Defense ranges; and provide instrumentation and ground equipment required to implement a GPS tracking capability.

b. (U) Provide a Deep Water Range (DWR) at the Atlantic Undersea Test and Evaluation Center. The range 35x75 mile in size will provide capabilities presently unavailable, permitting testing of longer range systems requiring deeper waters such as new generation Anti-Submarine Warfare (ASW) Weapons, sensors, and combat systems.

c. (U) Provide a Portable Tracking System (PTS) capable of instrumenting 500 square mile underwater/in-air area in various deep-water and open ocean areas. This system will support tests at diverse environment locations to realistically test modern ASW weapons.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605864N

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE: Test and Evaluation Support

PROJECT NUMBER: W2125

PROJECT TITLE: Test and Evaluation Modernization

3. (U) FY 1993 PLAN:

a. (U) PMTC will perform Low Rate Initial Production (LRIP) testing and evaluation on GPS for the Range Applications Joint Program Office (RAJPO) in conjunction with integrating GPS into PMTC Sea Test Range.

b. (U) NATC will attain Initial Operating Capability on GPS. NATC and PMTC will maintain interoperability with other ranges through integration of RAJPO data link systems in addition to R3 data links.

c. (U) AUTEC will perform limited LRIP testing and evaluation on GPS for RAJPO.

d. (U) AUTEC will perform on-site testing of the DWR system.

e. (U) AUTEC will continue upgrades to the PTS.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NUSC, Newport, RI; PACMISTESTCEN, Point Mugu, CA; NAVAIRTESTCEN, Patuxent River, MD; NAVWPNCEN, China Lake, CA; AUTEC, Andros Island, Bahamas. CONTRACTORS: To Be Determined.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not Applicable.

2. (U) SCHEDULE CHANGES: Not Applicable.

3. (U) COST CHANGES: The FY 1993 increase of \$+2,738K will be used to provide instrumentation required for the implementation of the GPS tracking capability.

F. (U) PROGRAM DOCUMENTATION: Not Applicable.

G. (U) RELATED ACTIVITIES: Not Applicable.

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605865N BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Operational Test and Evaluation Capability
PROJECT NUMBER: R0831 PROJECT TITLE: Operational T&E Force Support

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	FY1991 TITLE ACTUAL	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0831	Operational Test and Evaluation Force Support				
	7,220	7,601	9,159	Cont.	Cont.

B. (U) DESCRIPTION: This program element provides Commander, Operational Test and Evaluation Force general support funding for the planning, conducting, and reporting of operational test and evaluation of Navy weapon systems acquisition projects, as directed by the Chief of Naval Operations, and the development and validation of tactics to enhance tactical employment of the systems. Reports are made directly to the Chief of Naval Operations and the Secretary of the Navy. Operational test and evaluation of new weapon systems and the development and evaluation of tactics are required by directives of Secretary of Defense and by Public Law 98-94, among others. The level of effort is projected to increase due to more stringent requirements from the Congress and the Secretary of Defense for more realistic operational test and evaluation.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Issued operational test evaluation reports to the CNO and SECNAV reflecting Operational Test results, conclusions, and recommendations in support of production decisions and Fleet introduction decisions for new weapon systems.

2. (U) FY 1992 PROGRAM: To operationally test and evaluate Chief of Naval Operations projects commensurate with authorized funding level. Assume additional responsibility for operational testing of non-tactical automated information systems (AIS) as directed by CNO.

3. (U) FY 1993 PLANS: To operationally test and evaluate Chief of Naval Operations projects commensurate with authorized funding level. There will be an increased level of effort associated with the new DoD 5000 acquisition guidance. The new acquisition procedures require increased COMOPTEVFOR involvement in developmental testing and the Cost and Operational Effectiveness Analysis (COEA). A substantial portion of this involvement will begin in 1993.

4. (U) PROGRAM TO COMPLETION: This is a continuing project.

D. (U) WORK PERFORMED BY: IN-HOUSE: COMOPTEVFOR, Norfolk, VA; NAVWPNCEN, China Lake, CA; NUWES, Keyport, WA; and COMPACMISTESTCEN, Point Mugu, CA.
CONTRACTOR: PRC, Norfolk, VA.

E. (U) RELATED ACTIVITIES: Not applicable.

F. (U) OTHER APPROPRIATION FUNDS: Not applicable.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605866N BUDGET ACTIVITY: .5
PROGRAM ELEMENT TITLE: Navy Command & Control, Planning & Development
PROJECT NUMBER: R0739 PROJECT TITLE: Navy C² Top Level Warfare Requirements

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1991 ACTUAL	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROG
R0739	Navy C ² Top Level Warfare Requirements	3,205	2,994	3,033	Cont.	Cont.

B. (U) DESCRIPTION: This program element analyzes fleet requirements and R&D technology to develop top level plans for operating Navy space, electronic warfare, and C3I systems.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS: Provided analysis of current and future Navy command, control, and communications (C³) requirements and capabilities by examining the Space and Electronic Warfare (SEW) Baseline System and lessons learned from DESERT STORM/SHIELD. Evaluated high frequency (HF) communications in the Pacific and new approaches to employing the HF media. Provided rapid response services to investigate and develop prototype procedural and software solutions to emergent C³I requirements. Reviewed the function and Electronic Counter Measures (ECM) capability of Navy weapon systems to provide a baseline for Electronic Counter-counter Measures (ECCM) development.

2. (U) FY 1992 PROGRAM: Identify the technologies, systems, and tactics required to conduct the counter communications, counter surveillance, and counter targeting aspects of SEW. Develop a Navy SEW R&D strategy that will identify technological advancements needed for the SEW systems of the future. Continue development of Navy SEW plans and investigation of promising technologies for naval SEW applications.

3. (U) FY 1993 PLANS: Extend SEW planning to a stealth environment. Relate the effects of changing surface ship force structure to Navy Command and Control System (NCCS) Ashore and Afloat requirements. Continue development of Navy SEW plans and investigations of promising technologies for SEW applications.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAVWPNCEN, China Lake, CA; NRL, Washington, DC; NAVOCEANSYSNEN, San Diego, CA; NAVPGSCOL, Monterey, CA.
CONTRACTORS: Johns Hopkins University Applied Physics Laboratory, Laurel, MD; International Research Institute, Norfolk, VA.

E. (U) RELATED ACTIVITIES: PE 0603763N, Warfare Systems Architecture and Engineering.

F. (U) OTHER APPROPRIATION FUNDS: Not applicable.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605867N

BUDGET ACTIVITY: 4

PROGRAM ELEMENT TITLE: C2 Surveillance/Reconnaissance Support

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1991 ACTUAL	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMP	TOTAL PROG
Z1034	TAC SAT RECON OFC OFFICE	8,124	12,453	12,791	Cont	Cont
R2007	SPACE MGMT SUPPORT	1,165	1,153	1,126	Cont	Cont
X1368	NAV SPACE SYS ACT LA	306	305	115	Cont	Cont
	TOTAL	9,595	13,911	14,032	Cont	Cont

B. (U) DESCRIPTION:

(U) C2 Surveillance/Reconnaissance Support provides resources for Tactical Exploitation of National Capabilities (TENCAP). This unique, low-cost, high payoff project was established by Congress in 1977

The Space Management Support project supports various Navy space research and development projects and space systems testing. The Navy Space Systems Activity is located in Los Angeles and is the primary field support activity of the Navy Space Program Office.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605867N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: C2 Surveillance/Reconnaissance Support
PROJECT NUMBER: Z1034 PROJECT TITLE: TAC SAT RECON OFFICE

A. RESOURCES (U): (Dollars in thousands)

Project Number	Title	FY 1991 Actual	FY 1992 Estimate	FY 1993 Estimate	TO COMP	Total Prog
Z1034	TAC SAT RECON OFFICE	8,124	12,453	12,791	Cont.	Cont.

B. (U) DESCRIPTION: Established to exploit all National and Service sensor systems to improve tactical support to fleet operational commanders. Project also supports fleet exercises, which provide the venue for testing modifications to existing programs and being made aware of new requirements.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments:

a. (U)

b. (U) Began development of an automated multi-level security sanitizer that will permit reporting of tactically significant formatted information to disadvantaged users (i.e. shooters in addition to staffs) in situations where sensitive collection sources and methods must be protected.

c. (U)

d. (U)

e. (U) Completed development of Phase I of a Composite Tactical Display to allow analysts to assess data from multiple sources in an air threat environment. Prototype system in operation on site since April 1991.

f. (U) Started advanced planning on a Navy Joint Non-Cooperative Target Identification system.

2. (U) FY 1992 PROGRAM:

a. (U) Continue development of an automated multi-level security sanitizer that will permit reporting of tactically significant formatted information to disadvantaged users (i.e. shooters in addition to staffs) in situations where sensitive collection sources and methods must be protected.

b. (U)

c. (U) Improve contribution of satellite systems to the detection of

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FY 1993 RDT&E, NAVY, DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605867N **BUDGET ACTIVITY:** 4
PROGRAM ELEMENT TITLE: C2 Surveillance/Reconnaissance Support
PROJECT NUMBER: 21034 **PROJECT TITLE:** TAC SAT RECON OFFICE

d. (U) Develop semi-automated data extraction and analysis capabilities, hosted on the Composite Tactical Display, to assist analysts during contingency operations in geographic areas where comprehensive intelligence databases do not currently exist.

e. (U) Continue advanced planning on a Navy Joint Non-Cooperative Target Identification system.

f. (U) Test experimental sensors on the space shuttle.

g. (U) Improve secondary imagery dissemination to afloat and joint forces in support of power projection operations.

3. (U) FY 1993 Plans:

a. (U) Continue development of an automated multi-level security sanitizer that will permit reporting of tactically significant formatted information to disadvantaged users (i.e. shooters in addition to staffs) in situations where sensitive collection sources and methods must be protected.

b. (U)

c. (U)

d. (U)

e. (U)

f. (U)

g. (U) Start prototype development on a Navy Joint Non-Cooperative Target Identification system which will start an Advanced Technology Demonstration in FY93.

h. (U) Continue testing experimental sensors on the space shuttle.

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: Work performed under compartmented contracts.

E. (U) COMPARISON WITH FY 1992/3 PRESIDENT'S BUDGET:

1. (U) Technology Changes: None.

2. (U) Schedule Changes: None.

3. (U) Cost changes: None.

F. (U) PROGRAM DOCUMENTATION: NONACAT

G. (U) RELATED ACTIVITIES: PE 0603451N Tactical Space Operations

H. (U) OTHER APPROPRIATION FUNDS: None.

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

J. (U) MILESTONE SCHEDULE: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605867N BUDGET ACTIVITY: 4
PROGRAM ELEMENT TITLE: C2 Surveillance/Reconnaissance Support
PROJECT NUMBER: R2007 PROJECT TITLE: SPACE MGMT SUPPORT

C. (U) DESCRIPTION: This project provides resources to the Naval Space Command for the conduct of its support testing.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Evaluated advanced technology and commenced prototyping a system for tactical integration of space-derived information
- b. (U) Explored applications of optical interferometry for precise space object location.
- c. (U) Evaluated tactical utility of advanced space sensors and alternate C3 architectural options for space support to the fleet.

2. (U) FY 1992 PLANS:

- a. (U) Complete prototyping and commence test and demonstration of system for tactical integration of space-derived information.
- b. (U) Commence prototyping of optical interferometry equipment for precise space object location.
- c. (U) Conduct detailed engineering assessments of identified C3 architectural options for space support to the fleet.

3. (U) FY 1993 PLANS:

- a. (U) Complete test and demonstration of system for tactical integration of space-derived information.
- b. (U) Complete prototyping and commence test and demonstration of optical interferometry equipment for precise space object location.
- c. (U) Commence prototyping of equipment to provide most cost effective C3 architecture for space support to the fleet.
- d. (U) Conduct detailed engineering assessments of identified space sensors.

4. (U) Program to Completion: This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: Naval Surface Weapons Center (NSWC), Dahlgren, VA, Naval Research Laboratory (NRL), Washington, D.C. Contractor: TED.

F. (U) RELATED ACTIVITIES: PE 0102427N, Project X0125, Naval Space Surveillance; PE 0605867N, Project T1034, Tactical Satellite Reconnaissance Office.

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605867N **BUDGET ACTIVITY 4**
PROGRAM ELEMENT TITLE: C2 Surveillance/Reconnaissance Support
PROJECT NUMBER: X1368 **PROJECT TITLE:** NAV SPACE SYS ACT LA

C. (U) DESCRIPTION: This project provides support for the Navy Space Systems Activity, Los Angeles, CA, for the conduct of its mission and functions in its role as primary field support for the Navy Space Project.

D. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) **FY 1991 ACCOMPLISHMENTS:** Continued management, security, financial system analysis and computer service support to various Navy space and space-related programs.

2. (U) **FY 1992 PROGRAM:**

- a. (U) Continue financial systems analysis, computer services and administrative efforts to support Navy space programs.
- b. (U) Continue support in management and security.

3. (U) **FY 1993 PLANS:**

- a. (U) Continue financial systems analysis, computer services and administrative efforts to support Navy space programs.
- b. (U) Continue support in management and security.

4. (U) **PROGRAM TO COMPLETION:** This is a continuing program.

E. (U) WORK PERFORMED BY: IN-HOUSE: Naval Space Systems Activity, Los Angeles. CA.

F. (U) RELATED ACTIVITIES: PE 0603451N, Tactical Space Operations.

G. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

H. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605871M BUDGET ACTIVITY: 6
PROGRAM ELEMENT TITLE: Marine Corps Tactical Exploitation of National Capabilities
PROJECT NUMBER: C1424 PROJECT TITLE: Tactical Exploitation of National Capabilities (TENCAP)

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY 1991 ACTUAL	FY 1992 ESTIMATE	FY 1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
C1424	TENCAP	1,958	1,149	1,254	CONT.	CONT.

B. (U) DESCRIPTION: This program is designed to enhance the ability of tactical Marine Corps forces to exploit the capabilities of national intelligence gathering systems. Congressionally directed, it requires close liaison with the intelligence community and involves complex and highly-sensitive activities.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

- a. (U) Prepared Tactical Impact Statements (TIS) for three future national systems.
- b. (U) Co-sponsored planning for Joint Chiefs of Staff (JCS) directed TENCAP Special Project 1991.
- c. (U) Provided intelligence collection management and secondary imagery dissemination equipment for field test and evaluation.
- d. (U) Rewrote the Marine Corps Master Intelligence Plan (MCMIP), Imagery Plan (MCIIP), and TENCAP Plan.
- e. (U) Initiated exploration and demonstration of alternate communication/dissemination paths.

2. (U) FY 1992 PROGRAM:

- a. (U) Participate in National Intelligence Systems Development (NISD).
- b. (U) Submit TIS on National Intelligence Systems as required by Congress.
- c. (U) Pursue emerging technology with Defense Special Projects Office (DSPO) and other services.
- d. (U) Update the MCMIP and write the Signals Intelligence/Electronic Warfare (SIGINT/EW) Plan and Human Intelligence (HUMINT) Plan.
- e. (U) Explore and demonstrate alternate communication/dissemination paths.

3. (U) FY 1993 PLANS:

- a. (U) Participate in NISD and technology assessments with DSPO.
- b. (U) Submit TIS on National Intelligence Systems as required by Congress.
- c. (U) Participate in JCS Special Project planning and participate in JCS Special Project 1993 and Corrective Actions Review Committee.
- d. (U) Revise USMC Master Intelligence Plan (MCMIP/MCIIP/TENCAP, SIGINT/EW and HUMINT Plans).

4. (U) PROGRAM TO COMPLETION: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: SPAWAR, Washington, DC; NSSC (NAVSUP), Washington, DC; NOSC, San Diego, CA. CONTRACTORS: NONE.

E. (U) RELATED ACTIVITIES: NONE.

F. (U) OTHER APPROPRIATION FUNDS: NONE.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: NONE.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0605872A

BUDGET ACTIVITY: 6

PROGRAM ELEMENT TITLE: Productivity Investment

PROJECT NUMBER: W2006 PROJECT TITLE: Productivity Investment

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY-91 ACTUAL	FY-92 ESTIMATE	FY-93 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
W2006	Productivity Investment	650	532	416	0	5,727

B. (U) DESCRIPTION: This program provides for productivity enhancing capital investments at specified research and development laboratories. It supports development, purchase and/or implementation of improved equipment, facilities, procedures and labor quality, and alters the work environment to produce man-year savings and reduce costs while improving capabilities of Navy's RDT&E mission.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 ACCOMPLISHMENTS:

a. (U) Developed an equipment diagnostic expert system shell to assist Naval Repair Depot personnel in repairs.

2. (U) FY 1992 PROGRAM:

a. (U) Develop and procure a simulator for the Landing Gear Test System.

b. (U) Purchase hardware and software for Computer Aided Engineering Facility.

c. (U) Purchase, installation, and training for a plastics injection molding machine.

3. (U) FY 1993 PLANS:

a. (U) Upgrade the Combat Systems Analyzer Test Station.

b. (U) Purchase, installation, and training for an investment casting facility.

4. (U) PROGRAM TO COMPLETION: Program is completed in FY 1993.

D. (U) WORK PERFORMED BY: IN-HOUSE: NSWC, White Oak, MD; NAEC, Lakehurst, NJ; Naval Undersea Warfare Engineering Station, Keyport, Wa; CONTRACTORS: VITRO, Silver Spring, MD.

E. (U) RELATED ACTIVITIES: Not Applicable.

F. (U) OTHER APPROPRIATION FUNDS: Not Applicable.

G. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0708011N BUDGET ACTIVITY: 6 Defense-wide Mission Support
PROGRAM ELEMENT TITLE: Industrial Preparedness
PROJECT NUMBER: R1050 PROJECT TITLE: Manufacturing Technology

A. (U) RESOURCES: (Dollars in Thousands)

PROJECT NUMBER	TITLE	FY1991 ACTUAL	FY1992 ESTIMATE	FY1993 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R1050	MANTECH	110,069	20,356	45,384	Continuing	Continuing

B. (U) DESCRIPTION: The Navy Manufacturing Technology program is intended to improve the productivity and responsiveness of the U.S. defense industrial base by funding the development of manufacturing technologies. The Navy program, by providing seed funding for the development of moderate to high risk process and equipment technology, permits contractors to upgrade their manufacturing capabilities. Ultimately, the program aims to produce high-quality weapon systems with shorter lead times and reduced acquisition costs. Major areas of endeavor both underway and planned include: electronics assembly, laser metal working, flexible machining, computer integrated manufacturing, advanced composites manufacturing, automated ship propeller manufacturing, repair technology for aircraft, and advanced metalworking technologies.

C. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1991 Accomplishments: Continued development of advanced composite manufacturing technology. Continued development of advanced metalworking manufacturing technology. Continued development of intelligent manufacturing technology. Commenced development work in electronics manufacturing. Commenced work in Spray Metal Forming and double hull ship construction.

2. (U) FY 1992 Program: Continue work in advanced composites technology. Continue work in metalworking technology. Continue development of electronics manufacturing technology and work in automated assembly. Continued development of intelligent manufacturing technology. Finish work on the Integrated Computer Aided Manufacturing of Propeller program. Plan to terminate the following projects: Advanced Electronic Packaging, Hybrid Microcircuit Computer Integrated Manufacturing, Fiber Optic Microcable, Submarine Propulsors, Lightweight Ship Structures, & Laser Cladding of Valves, Ausrolling for Gears, Submicron Resist, Ion Plating Superconductor, Titanium Aluminide XD Composites, DNC Mfg. Cell for Bonded A/C Components, Expert System For Welding, Cast Ductile Projectile, National Shipbuilding Research Program, Powdered Metallurgy, High Thermal Pitch Fibers, Shipbuilding MANTECH (Propulsors), Spray Metal Forming, Acquisition Training, Concurrent Engineering for Injection Molding, and Strategic Planning.

3. (U) FY 1993 Plans: Continue development of advanced composites manufacturing technology. Continue development of advanced metalworking manufacturing technology. Continue development of intelligent automation technology. Continue development of advanced electronic assembly manufacturing technology. Participate in the development of new interface and communications standards relating to manufacturing. Further develop and successfully demonstrate concepts of product model development and transfer standards.

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FY 1993 RDT&E, NAVY DESCRIPTIVE SUMMARY

PROGRAM ELEMENT: 0708011N BUDGET ACTIVITY: 6 Defense-wide Mission Support
PROGRAM ELEMENT TITLE: Industrial Preparedness
PROJECT NUMBER: R1050 PROJECT TITLE: Manufacturing Technology

4. (U) Program to Completion: This is a continuing program.

D. (U) WORK PERFORMED BY: IN-HOUSE: NAC, Indianapolis, IN; NOSC, San Diego, CA; DTRC, Bethesda, MD; NRL, Washington, D.C; NSWC, Silver Spring, MD; NSWC, Dahlgren, VA; NWSA, Crane, IN; NWC, China Lake, CA; NIST, Gaithersburg, MD; CONTRACTORS: Applied Research Lab Penn State, State College, PA; McDonnell Douglas Aircraft Corporation, St. Louis, MO; Metalworking Technology Inc., Johnstown, PA; Great Lakes Composites Consortium, Kenosha, WI.

E. (U) COMPARISON WITH FY 1992/1993 PRESIDENT'S BUDGET:

1. (U) TECHNOLOGY CHANGES: Not Applicable

2. (U) SCHEDULE CHANGES: Not Applicable

3. (U) COST CHANGES: The decrease of \$1.2M in FY93 is associated with pricing adjustments.

F. (U) PROGRAM DOCUMENTATION: NAPDD for Manufacturing Technology Program in review cycle.

G. (U). RELATED ACTIVITIES: This is the only Navy program element which funds Manufacturing Technology. The Army and the Air Force also have Manufacturing Technology programs in the same Program Element 0708011. A separate OSD line item was established in FY91. The Navy MANTECH program keeps in constant communication with the 6.1 and 6.2 programs.

H. (U) OTHER APPROPRIATION FUNDS: Not Applicable

I. (U) INTERNATIONAL COOPERATIVE AGREEMENTS: Not Applicable

J. (U) MILESTONE SCHEDULE: Not Applicable

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FY1992/1993 MANUFACTURING TECHNOLOGY PROGRAM

Program Element: 0708011N
DOD Mission Area: 480

Title: Industrial Preparedness
Budget Activity: 6

Procurement Appropriation Supported

Project (Title)
I.D. (End Item Supported)

		FY-91 Actual	FY-92 Estimate	FY-93 Estimate	Additional To Completion	Total Estimate Costs
SHIPBUILDING AND CONVERSION, NAVY						
M 0512	Automated Manufacturing Research Facility (All Ship Construction)	5604	0	6000	Continuing	Continuing
S 1101	Integrated Computer Aided Manufacturing of Propellers (Ship Construction and Overhaul)	1500	200	0	0	3700
S 1109	Robotic Adaptive Welding System (RAWS) (All Ship Construction)	0	0	0	0	15
S 1218	National Shipbuilding Research Program (All Ship Construction)	1775	0	2500	Continuing	Continuing
M 0538	Plasma Arc-CNC Machining Cell (Ship Repair/Overhaul)	100	0	0	0	450
M 0543	Congressionally Directed Shipbuilding Projects (HY Steel Dev. and Electroslag Weld.) (All Ship Construction and Repair)	3000	0	0	0	4380
M 0544	Next Generation Shipbuilding Technology (All Ship Construction)	24000	0	0	0	24000
M 0545	Spray Metal Forming (All Ship Construction)	5000	0	0	0	17000
M 0549	Advanced Propulsor Manufacturing Technology (All Ship Construction)	550	0	2000	8000	10550
S 1413	Laser Cladding of Valve Components (All Ship Construction)	100	0	0	0	200
TOTAL SUPPORT FOR SHIPBUILDING AND CONVERSION, NAVY						
		41629	200	10500	Continuing	Continuing

FY1992/1993 MANUFACTURING TECHNOLOGY PROGRAM

Program Element: 0708011N
DOD Mission Area: 480

Title: Industrial Preparedness
Budget Activity: 6

Procurement Appropriation Supported

Project (Title)
I.D. (End Item Supported)

	FY-91 Actual	FY-92 Estimate	FY-93 Estimate	Additional To Completion	Total Estimate Costs
AIRCRAFT PROCUREMENT, NAVY					
X 0407	Circuit Card Assembly and Processing System (AN/AYK-14, UYS-1, EMSP, SUBACS, VHSIC)				
	337	0	0	0	61453
X 0504	Integrated Mfg. Electronic Packaging (EMSP, AN/UY-1, AN/AG-65, VHSIC)				
	2180	0	0	0	9710
X 0501	Advanced Integrated Circuit/VHSIC MT (Navy Electronic System)				
	1700	0	0	0	13350
X 0903	Masked Ion Beam Lithography (Navy Electronic Systems)				
	0	0	0	0	2754
X 0972	Heat Pipes, MT (Navy Electronic Systems)				
	0	0	0	0	2029
A 2010	Advanced Repair Technologies for A/C Rework Applications (All Navy Aircraft)				
	1750	0	0	0	Continuing
A 2011	Cost Effective Manufacture of Airframe Structures and A/C Components (All Navy Aircraft)				
	1750	0	0	0	Continuing
	Transmit/Receive Modules for Navy Applications (Advanced Navy Systems)				
	3000	0	0	0	20000
TOTAL FOR SUPPORT OF AIRCRAFT PROCUREMENT, NAVY					
	10717	0	0	0	Continuing Continuing
WEAPONS PROCUREMENT, NAVY					
S 0806	MT For Laser Assisted Metalworking (Guns, Missiles, and Launchers)				
	2765	0	1700	Continuing	Continuing

FY1992/1993 MANUFACTURING TECHNOLOGY PROGRAM

Program Element: 0708011N
DOD Mission Area: 480

Title: Industrial Preparedness
Budget Activity: 6

Procurement Appropriation Supported

Project (Title)
I.D. (End Item Supported)

		FY-91 Actual	FY-92 Estimate	FY-93 Estimate	Additional To Completion	Total Estimate Costs
WEAPON PROCUREMENT, NAVY (CONTD)						
M 0521	Modern Casting Technology for Projectiles (Navy Gun Projectiles)	6000	0	0	0	15000
S 1407	MT For Fiber Optic Microcable (MK 48, Wire Guided Torpedos)	1100	0	0	0	2300
A 2004	Single Crystal Sapphire Domes (Sidewinder, ASAAM)	0	0	0	0	640
TOTAL FOR SUPPORT OF WEAPONS PROCUREMENT, NAVY						
		9865	0	1700	Continuing	Continuing

OTHER PROCUREMENT, NAVY

M 0511	Electronics Manufacturing Productivity Facility	500	0	6435	Continuing	Continuing
M 0522	National Center of Excellence for Metalworking Technology (Generic Technology for All Navy Systems)	9800	10400	10000	Continuing	Continuing
M 0529	National Center of Excellence for Composites Manufacturing Technology (Generic Technology for All Navy Systems)	5000	10000	10000	Continuing	Continuing
M 0422	Missile and Torpedo Shells from Spun SiC/Al (Advanced Missiles and Torpedos)	261	0	0	0	1790
M 0523	Superconductivity (Advanced Navy Systems)	400	0	0	0	2350
M 0528	Submicron Resist MT (Navy Electronic Systems)	1700	0	0	0	4765
M 0526	A/I for Welding (Generic Technology for All Navy Systems)	1270	0	0	0	2400

FY1992/1993 MANUFACTURING TECHNOLOGY PROGRAM

Program Element: 0708011N
DOD Mission Area: 480

Title: Industrial Preparedness
Budget Activity: 6

Procurement Appropriation Supported

Project (Title)
I.D. (End Item Supported)

	FY-91 Actual	FY-92 Estimate	FY-93 Estimate	Additional To Completion	Total Estimate Costs
OTHER PROCUREMENT, NAVY (CONTD)					
M 0527	Advanced Composites Manufacture for Improved Thermal Management (All Navy Weapon Systems)				
	2850	0	0	0	20000
M 0532	MT for High Thermal Conductivity Fibers (Advanced Navy Systems)				
	354	0	0	0	575
M 0540	Ausrolling for Gears (Aircraft Engines and Torpedos)				
	920	0	0	0	2470
M 0546	Acquisition Training (All Navy Weapon Systems)				
	3000	0	0	0	3000
M 0547	Advanced Design for Polymer Composites Manufacturing (Generic Technology for All Navy Systems)				
	418	0	0	0	5400
M 0548	Powder Metallurgy (Generic Technology for All Navy Systems)				
	3000	0	0	0	Continuing
M 0550	Strategic Materials, Manufacturing Technology (Generic Technology for All Navy Systems)				
	8900	0	0	0	8900
	Manufacturing Technology Strategic Planning (All Navy Weapon Systems)				
	845	0	749	Continuing	Continuing
TOTAL FOR SUPPORT OF OTHER PROCUREMENT, NAVY					
	39218	20400	27184	Continuing	Continuing
MT PROJECT SUPPORT					
	8640	2156	6000	Continuing	Continuing
TOTAL NAVY					
	110069	22756	45384	Continuing	Continuing

SECTION II

CONSTRUCTION AT RDT&E,N FACILITIES

MAJOR IMPROVEMENTS TO AND CONSTRUCTION OF GOVERNMENT-OWNED FACILITIES FUNDED BY RDT&E

The data provided by this exhibit includes the following:

Part I - Utilization of Section 2353, Title 10 Authority - Specialized R&D Facilities and/or Equipment Constructed by or Furnished to Contractors

SECTION I - Projects accomplished or underway

SECTION II - Projects planned or projected.

Part II - Utilization of RDT&E for Facilities at Government-Owned/Government-Operated Installations

SECTION I - Projects accomplished or underway

SECTION II - Projects planned or projected

Part III - Utilization of RDT&E Appropriation for Minor Construction

RD-4

DEPARTMENT OF DEFENSE, MILITARY

RD&E, NAVY

MAJOR IMPROVEMENTS TO AND CONSTRUCTION OF GOVERNMENT-OWNED FACILITIES FUNDED BY RD&E

Part I. UTILIZATION OF SECTION 2353. TITLE 10 AUTHORITY

Specialized R&D facilities and/or equipment determined to be necessary for the performance of a contract for a Military Department for research and development may be constructed by or furnished to the contractor and funded from appropriations available for research, development, test and evaluation. The Congress enacted this legislation, now 10 USC 2353, in 1956. This policy is executed through DOD Directive 4275.5. Under this policy, the Secretaries of the Military Departments or their designees, and the Directors of Defense Agencies may approve facilities projects up to \$3,000,000; the Under Secretary of Defense (Acquisition) approves projects exceeding \$3,000,000. The Congress is notified in advance of starting any project involving construction, regardless of the dollar amount. The table below provides a summary listing of all such projects accomplished in FY-91 and planned in FY-92 and FY-93.

<u>FACILITY/EQUIPMENT</u>	<u>RD&E.N</u>		<u>TOTAL OBLIGATION AUTHORITY</u>	
	<u>PE/PROJ</u>		<u>(THOUSANDS OF DOLLARS)</u>	
	<u>NUMBER</u>	<u>CONTRACTOR</u>	<u>FY91</u>	<u>FY92</u> <u>FY93</u>

SECTION I

PROJECTS ACCOMPLISHED OR UNDERWAY

Aberdeen Proving Grounds Underwater Explosion Test Facility 1/ 2/	0604561N N1946	TBD	Aberdeen Proving Ground, Maryland	\$6,177	\$16,194	0
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1/ Previously listed in the Department of the Navy, Supporting data for FY 92/93 Budget Estimates Descriptive Summaries, dated February 1991.
2/ DD 1391 Attached for Site Modification associated with this effort.

	<u>TOTAL OBLIGATION AUTHORITY</u>		
	<u>(THOUSANDS OF DOLLARS)</u>		
	<u>FY91</u>	<u>FY92</u>	<u>FY93</u>

<u>FACILITY/EQUIPMENT</u>	<u>RDT&E.N</u>	<u>CONTRACTOR</u>	<u>LOCATION</u>
	<u>PE/PROJ</u>		
	<u>NUMBER</u>		

SECTION II

PROJECTS PLANNED OR PROJECTED

NONE IDENTIFIED

Total, Part I

<u>\$6,177</u>	<u>\$16,194</u>	<u>\$ 0</u>
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MAJOR IMPROVEMENTS TO AND CONSTRUCTION OF GOVERNMENT-OWNED FACILITIES FUNDED BY RDT&E

PART II. UTILIZATION OF RDT&E.N APPROPRIATION FOR FACILITIES AT GOVERNMENT-OWNED/GOVERNMENT-OPERATED INSTALLATIONS

Chapter 251 of the DOD Budget Guidance Manual (which was approved by the GAO as DOD Instruction 7220.5) provides that RDT&E appropriations may finance the development, design, purchase, and installation (including directly related foundations, shielding, environmental control, weather protection, structural adjustments, utilities and access) of equipment or instrumentation required for research, development, test and evaluation activities. The table below provides a summary listing of all such projects for the installation of equipment, where the cost of installation is \$200,000 or more, accomplished in FY-91 and planned in FY-92 and FY-93.

FACILITY/EQUIPMENT	RDT&E.N PE/PROJ NUMBER	LOCATION	TOTAL OBLIGATION AUTHORITY (THOUSANDS OF DOLLARS)		
			FY91	FY92	FY93
SECTION I PROJECTS ACCOMPLISHED OR UNDERWAY					
Propulsor Prototype 1/ 2/	0604561N N1946	DOE/Oak Ridge Oak Ridge, TN	\$7,845	\$---	\$---
Large Cavitation Channel (LCC) 1/	0605862N X1957/S1957	CBI Nuclear Co. Facility Memphis, TN	\$4,810	\$4,621	\$5,734 /

1/ Previously listed in the Department of the Navy, Supporting data, for FY 92/93 Budget Estimates Descriptive Summaries, dated February 1991.
2/ 00 1391 Attached for alteration costs associated with this effort, \$7.8M.

TOTAL OBLIGATION AUTHORITY (THOUSANDS OF DOLLARS)		
FY91	FY92	FY93

RDTEEN
PE/PROJ
NUMBER

CONTRACTOR LOCATION

FACILITY/EQUIPMENT

SECTION II
PROJECTS PLANNED OR PROJECTED

None Identified

Total, Part II

\$12,655	\$ 4,621	\$ 5,734
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LARGE CAVITATION CHANNEL

DAVID TAYLOR RESEARCH CENTER Bethesda, MD
(CBI NUCLEAR COMPANY FACILITY, MEMPHIS, TN)

(THOUSANDS OF DOLLARS)

<u>FY91</u>	<u>FY92</u>	<u>FY93</u>
\$4,810	\$4,621	\$5,734

DESCRIPTION OF PROJECT:

This project was started in FY 1987 and will be ready for operations in late FY 1991. The Large Cavitation Channel (LCC) will be a ship and model testing similar to a wind tunnel except that it will be filled with water. The overall size of the circuit will be 65 feet in height and 239 feet in length. Its primary function will be to test models of ship and submarine hulls together with their propulsors and appendages to meet increasing stringent U. S. Navy requirements for improved propulsive quietness and efficiency. Within the circuit, the test section size will be 10 x 10 x 40 feet, which will allow a large enough model for accurate scaling without excessive distortion of the flow due to the channel walls. The channel will be completed in time for the design of the next generation ships. The facility is a David Taylor Research Center field activity.

The major non-servable items included in the project and the dollar values are as follows:

<u>Item</u>	<u>Value (Thousands of Dollars)</u>
Channel circuit	\$33,510
Pump and drive machinery	\$ 9,582

There are no major severable items.

The David Taylor Research Center has signed contract number N00167-87-C-0088 with CBI Na-Cbn, Inc. for design, fabrication, and installation of the LCC. The LCC will support RDT&E on all classes of ships in the Navy and all future classes into the next century, including the SSN 21. Pertinent schedule dates are as follows:

FY 1986: Issued Request for Proposals and received proposals.

FY 1987: Evaluated proposals, negotiated and awarded contract, began engineering design based on Government-Furnished Design.

FY 1988: Initiated civil improvements at Memphis, TN; established LCC Site as detachment of DTRC; and completed delivery of 14,000 HP pump motor controls.

LARGE CAVITATION CHANNEL (Continued)

FY 1989: Completed LCC acoustic trench concrete work: initiated intersection of stainless steel channel in acoustic trench; and complete all civil improvements. LCC field installation.

FY 1990: Continue LCC installation.

FY 1991: Complete LCC installation, acceptance testing, initial calibration, and initiate LCC operation.

FY 1992: Continue LCC operations under realty lease agreement.

FY 1993: Continue LCC operations under realty lease agreement.

MAJOR IMPROVEMENTS TO AND CONSTRUCTION OF GOVERNMENT-OWNED FACILITIES FUNDED BY RDT&E

PART III. UTILIZATION OF RDT&E, N APPROPRIATION FOR MINOR CONSTRUCTION

For in-house installations, construction projects in support of R&D for \$200,000 or less are funded from the RDT&E appropriation. Such expenditures are authorized by 10 USC 2805 and the applicable provisions of the current DOD Appropriation Act. Under this procedure, project approval at this level is authorized by the Major Command concerned, or delegated to R&D installation commanders as appropriate. The table below provides a summary total of such minor construction accomplished in FY-90 and the estimated amounts planned for FY-91 and FY-92. In FY-93, all minor construction was transferred to the MILCON appropriation. All minor construction must result in a complete and useable facility. In no event are two or more minor construction projects or minor and major construction projects to be contrived to form a useable facility.

SUMMARY OF MINOR CONSTRUCTION FUNDED BY RDT&E, NAVY
(Thousands of Dollars)

Total, Part III	<u>FY 91</u> <u>8,838</u>	<u>FY 92</u> <u>7,373</u>	<u>FY 93</u> <u>0 1/</u>
GRAND TOTAL *	<u>\$27,670</u>	<u>\$28,188</u>	<u>\$5,734</u>

* Major Improvements to, and Construction of, Government-Owned Facilities funded by Research, Development, Test and Evaluation.

1/ Transferred to Military Construction, Navy Appropriation.

1. COMPONENT NAVY		FY 1991 MILITARY CONSTRUCTION PROJECT DATA		2. DATE 2/92	
3. INSTALLATION AND LOCATION US ARMY COMBAT SYSTEMS TEST ACTIVITY ABERDEEN PROVING GROUND, MD 21005			4. PROJECT TITLE UNDERWATER EXPLOSION TEST FACILITY (UTF)		
5. PROGRAM ELEMENT 0604561N	6. CATEGORY CODE	7. PROJECT NUMBER N1946	8. PROJECT COST (\$000) \$22,371		
9. COST ESTIMATES					
ITEM		U/M	QUANTITY	UNIT COST	COST (\$000)
UNDERWATER EXPLOSION TEST FACILITY		LS			
- POND EXCAVATION & SITE PREPARATION					\$12,469
- CONSTRUCTION OF MARINE RAILWAY AND TEST VEHICLE RAILWAY SYSTEM					9,902
10. DESCRIPTION OF PROPOSED CONSTRUCTION Underwater Explosion Test Facility (UTF) consisting of a pond, a marine railway, and a test vehicle system.					
11. Requirements: Projects: The SSN21 must complete Congressionally mandated live fire test. This effort will include shock testing various test vehicles. Requirement: Alternative to conducting shock tests of large test platforms at the UTF is open ocean testing. Open ocean testing will cost approximately \$0M more than UTF testing due to increased costs associated with logistics support and delays caused by weather uncertainties and protest groups. Further restrictions have been imposed due to environmental concerns. Extensive site survey conducted prior to selection of Aberdeen Proving Grounds as the site of the UTF. Current Situation: Current method of shock testing with large test platforms such as the Submersible Shock Test Vehicle is in the open ocean. Most recent open ocean test experienced delays and cost increases due to environmental concerns, protestors, public interest groups, weather conditions, and relocated test site area. f Impact if Not Provided: Congressionally mandated live fire test requirements will not be achieved. Further, the current SEAWOLF RDT&E Budget					

1. COMPONENT NAVY	FY 19 <u>91</u> MILITARY CONSTRUCTION PROJECT DATA	2. DATE 2/92
3. INSTALLATION AND LOCATION US ARMY COMBAT SYSTEMS TEST ACTIVITY ABERDEEN PROVING GROUND, MD 21005		
4. PROJECT TITLE UNDERWATER EXPLOSION TEST FACILITY (UTF)		5. PROJECT NUMBER N1946
<p>will not support open ocean testing of large test platforms.</p> <p><u>Additional:</u> Significant cost avoidance and reduced risk to SEAWOLF Live Fire Test Program justify this effort.</p>		

1. COMPONENT NAVY		FY 1991 MILITARY CONSTRUCTION PROJECT DATA		2. DATE 2/92	
3. INSTALLATION AND LOCATION DEPARTMENT OF ENERGY, OAK RIDGE PO BOX E, OAK RIDGE, TN 37830			4. PROJECT TITLE FULL SCALE PROPULSOR PROJECT		
5. PROGRAM ELEMENT 0604561N	6. CATEGORY CODE	7. PROJECT NUMBER N1946	8. PROJECT COST (\$000) \$7,845		
9. COST ESTIMATES					
ITEM		U/M	QUANTITY	UNIT COST	COST (\$000)
FULL SCALE PROPULSOR PROJECT					
BUILD EXPANSION TO ACCOMMODATE ASSEMBLY REQUIREMENT					\$3,404
REROUTE AIR HANDLING, PERFORM CEILING AND FOUNDATION MODIFICATIONS					\$4,337
PAINT FACILITY MODIFICATIONS					\$ 104
10. DESCRIPTION OF PROPOSED CONSTRUCTION					
<p>Modifications to the Department of Energy (DOE) Lab/Oak Ridge. This includes the redesign, assembly, foundation and ceiling installation, ventilation restructuring and installation of environmental controls.</p>					
11. REQUIREMENTS:					
<p>PROJECT: The DOE Lab at Oak Ridge is being used for the development of the SSN21 Prototype Propulsor.</p>					
<p>REQUIREMENT: The Lab must be modified to accommodate large numerically controlled machines being utilized for the SSN21 propulsor.</p>					
<p>IMPACT IF NOT PROVIDED: Unless modifications are completed to the DOE/Oak Ridge Facility, the schedule for the SSN21 will be severely impacted.</p>					